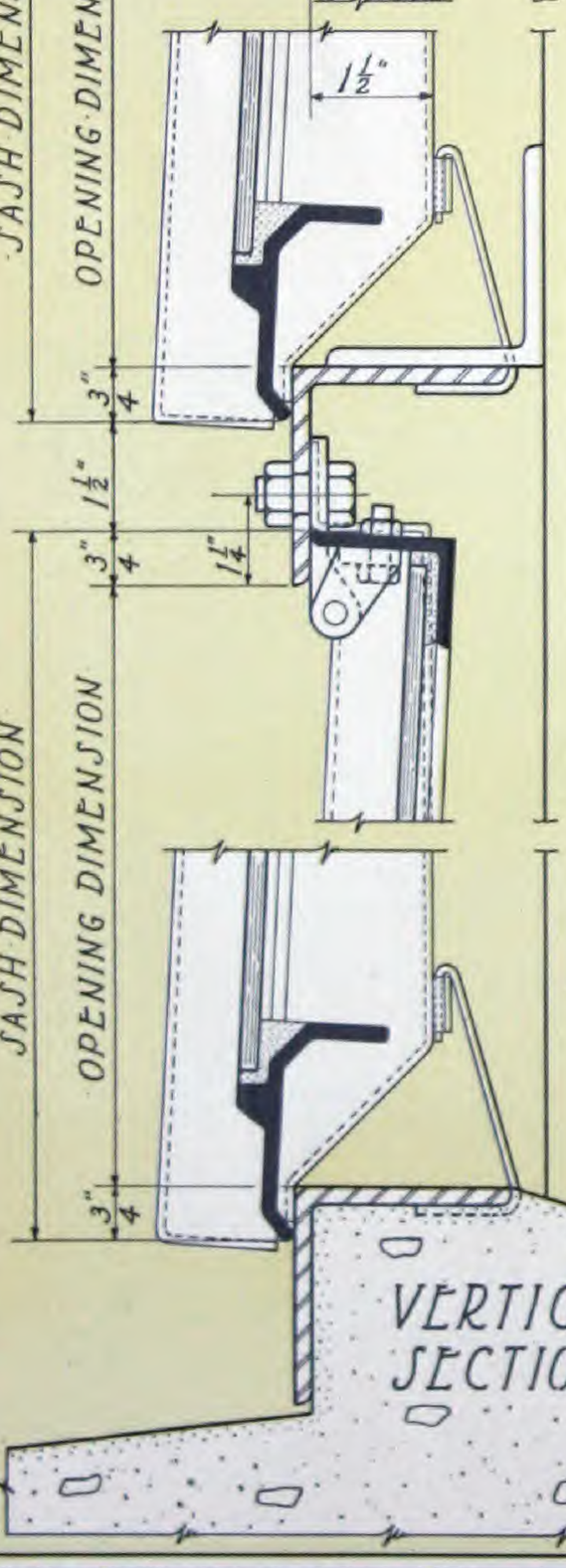
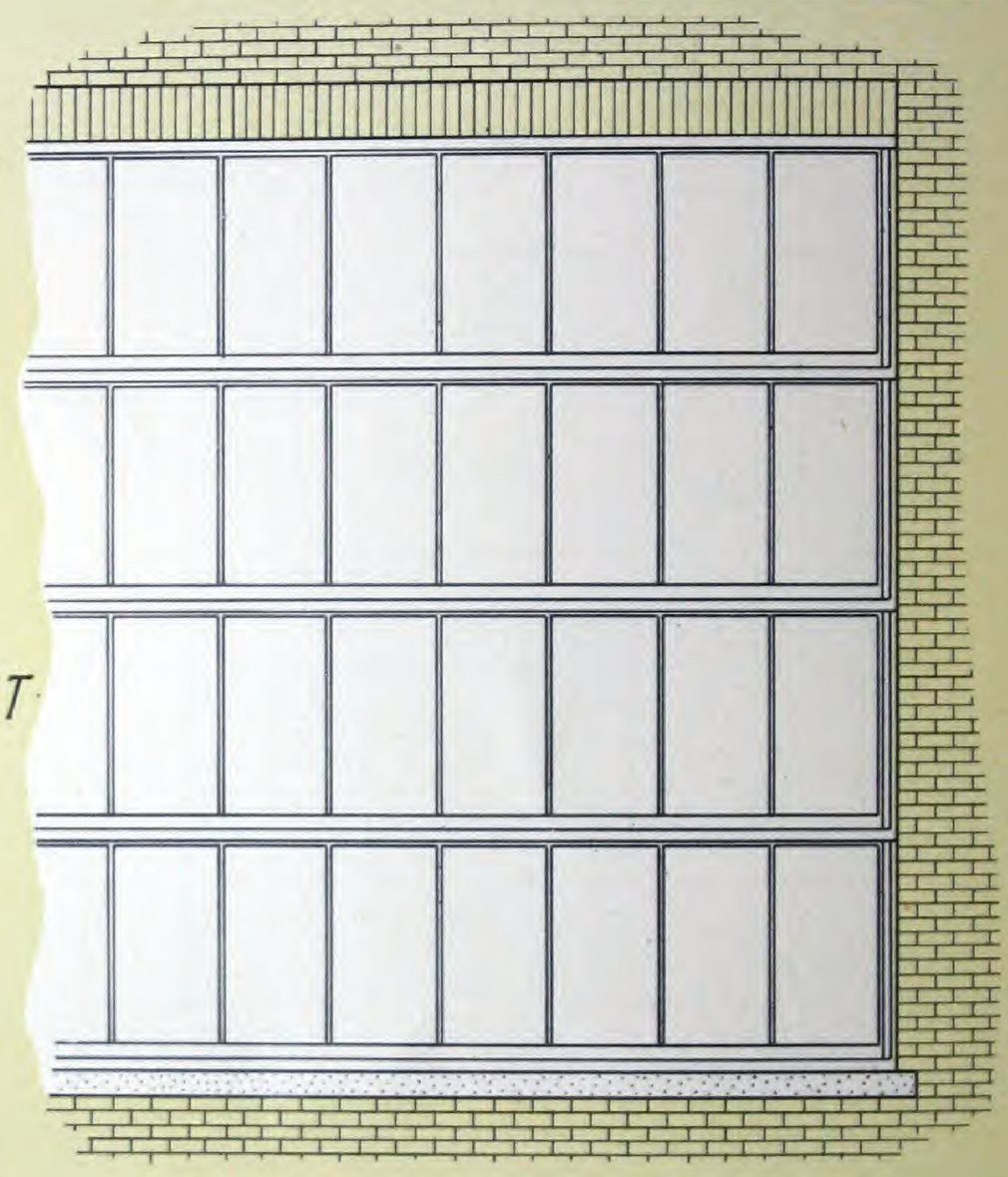
SIDE WALL SASH DETAILS

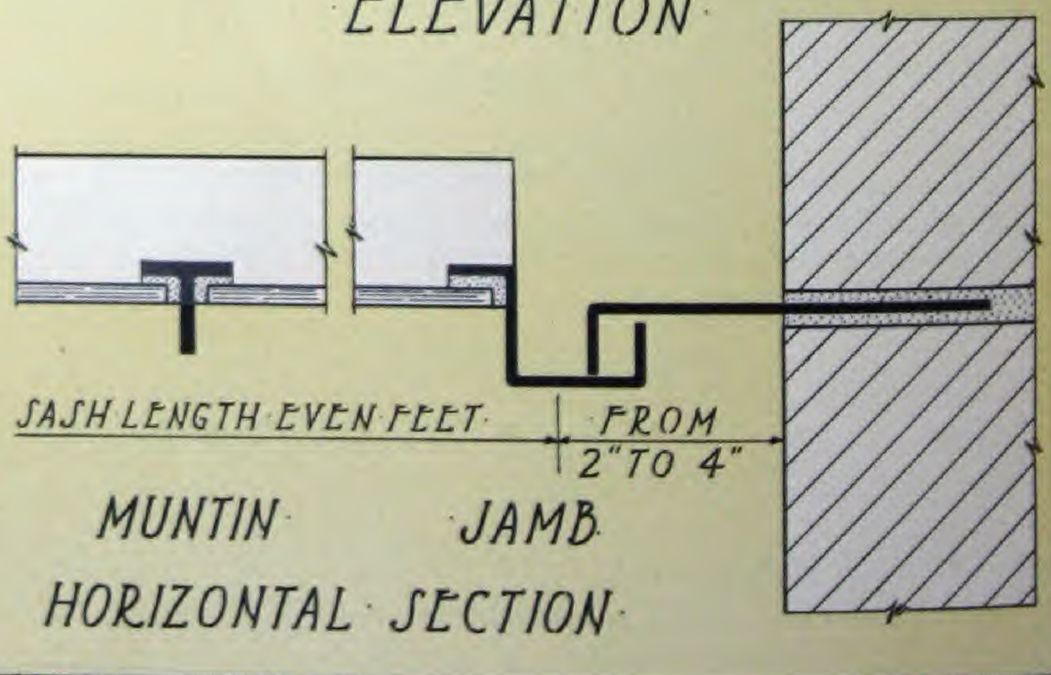
NOTE:- STRUCTURAL STEEL & FLASHING **NOT** FURNISHED BY LUPTON

TABLE OF STANDARD SASH & OPENING DIMENSIONS	
SASH DIM.	OP'G. DIM.
3'-0"	2'-10 1/2"
4'-0"	3'-10 1/2"
5'-0"	4'-10 1/2"
6'-0"	5'-10 1/2"





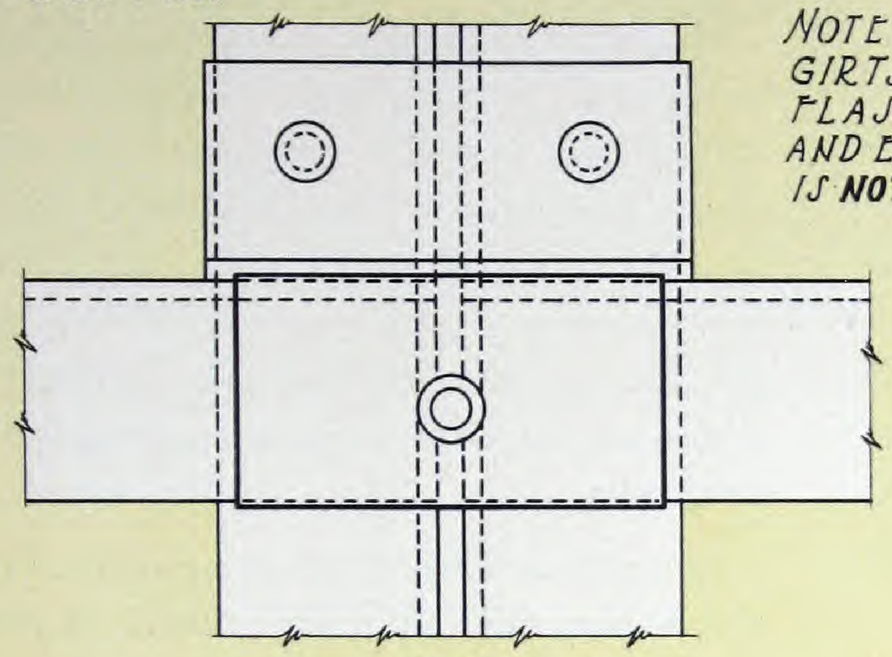
ELEVATION



HORIZONTAL SECTION

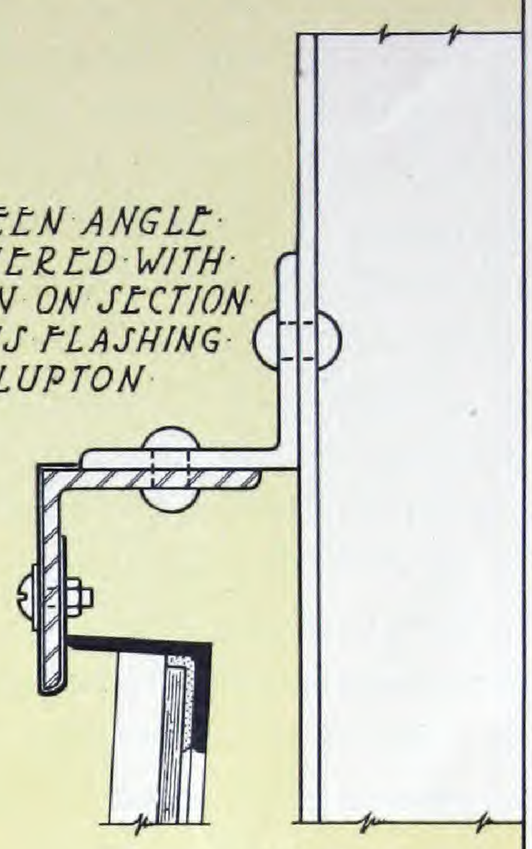
HINGE PUNCHING & GIRT ANGLE FLASHING

NOTE - STRUCTURAL STEEL & FLASHING **NOT** FURNISHED BY LUPTON

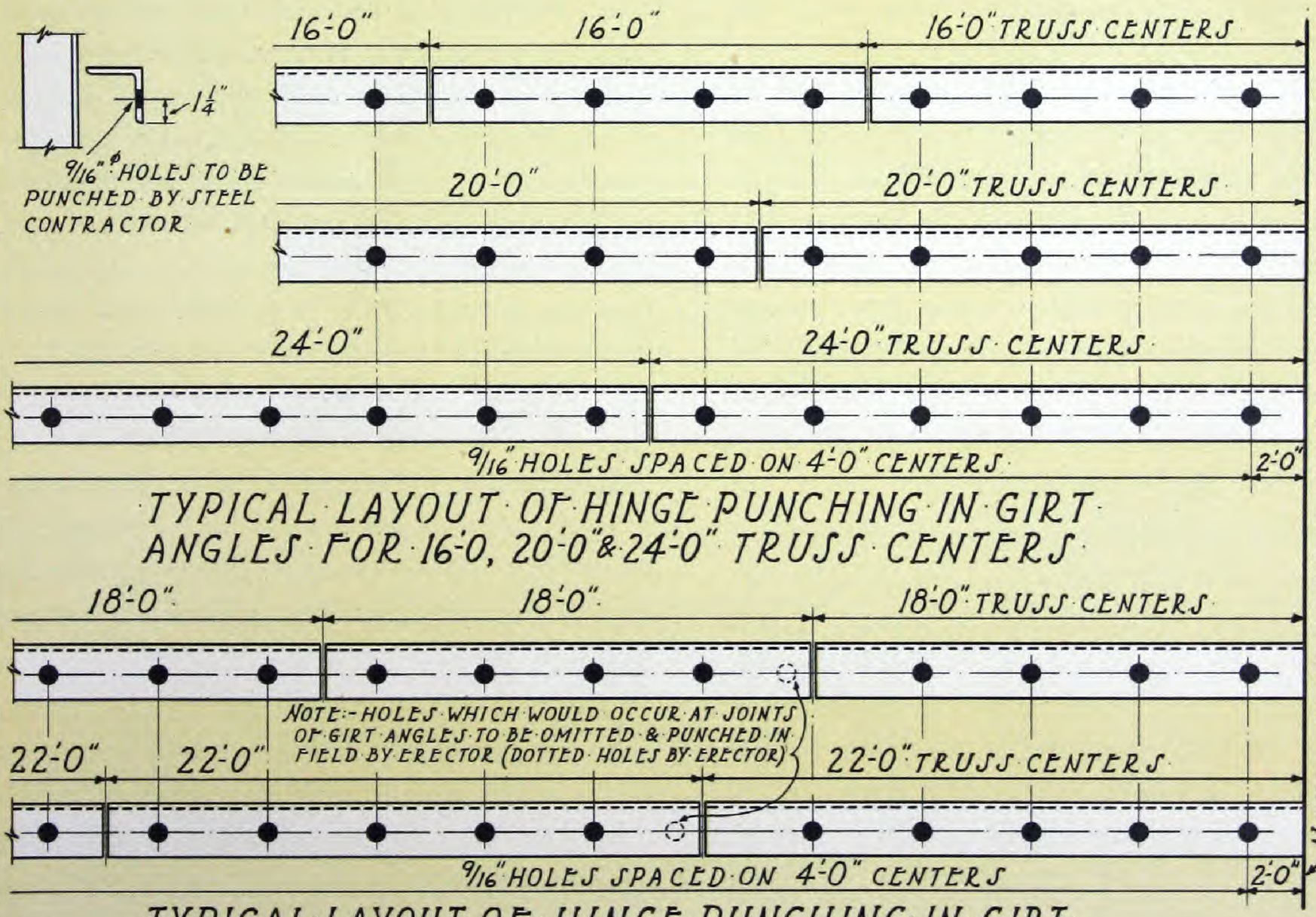


ELEVATION

NOTE - JOINTS BETWEEN ANGLE GIRTS MUST BE COVERED WITH FLASHING AS SHOWN ON SECTION AND ELEVATION THIS FLASHING IS **NOT** FURNISHED BY LUPTON



SECTION



TYPICAL LAYOUT OF HINGE PUNCHING IN GIRT ANGLES FOR 16'-0, 20'-0" & 24'-0" TRUSS CENTERS

TYPICAL LAYOUT OF HINGE PUNCHING IN GIRT ANGLES FOR 18'-0" & 22'-0" TRUSS CENTERS

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POND CONTINUOUS SASH

POND OPERATING DEVICE

Manufactured Exclusively by

DAVID LUPTON'S SONS CO.

Philadelphia

A. I. A. File Number 16 e 1

POND
CONTINUOUS SASH

POND ROOF DESIGN
POND OPERATING DEVICE

Catalogue No. 12

Pond Continuous Sash Chapter

LUPTON · STEEL · WINDOWS

"EVERYWHERE"

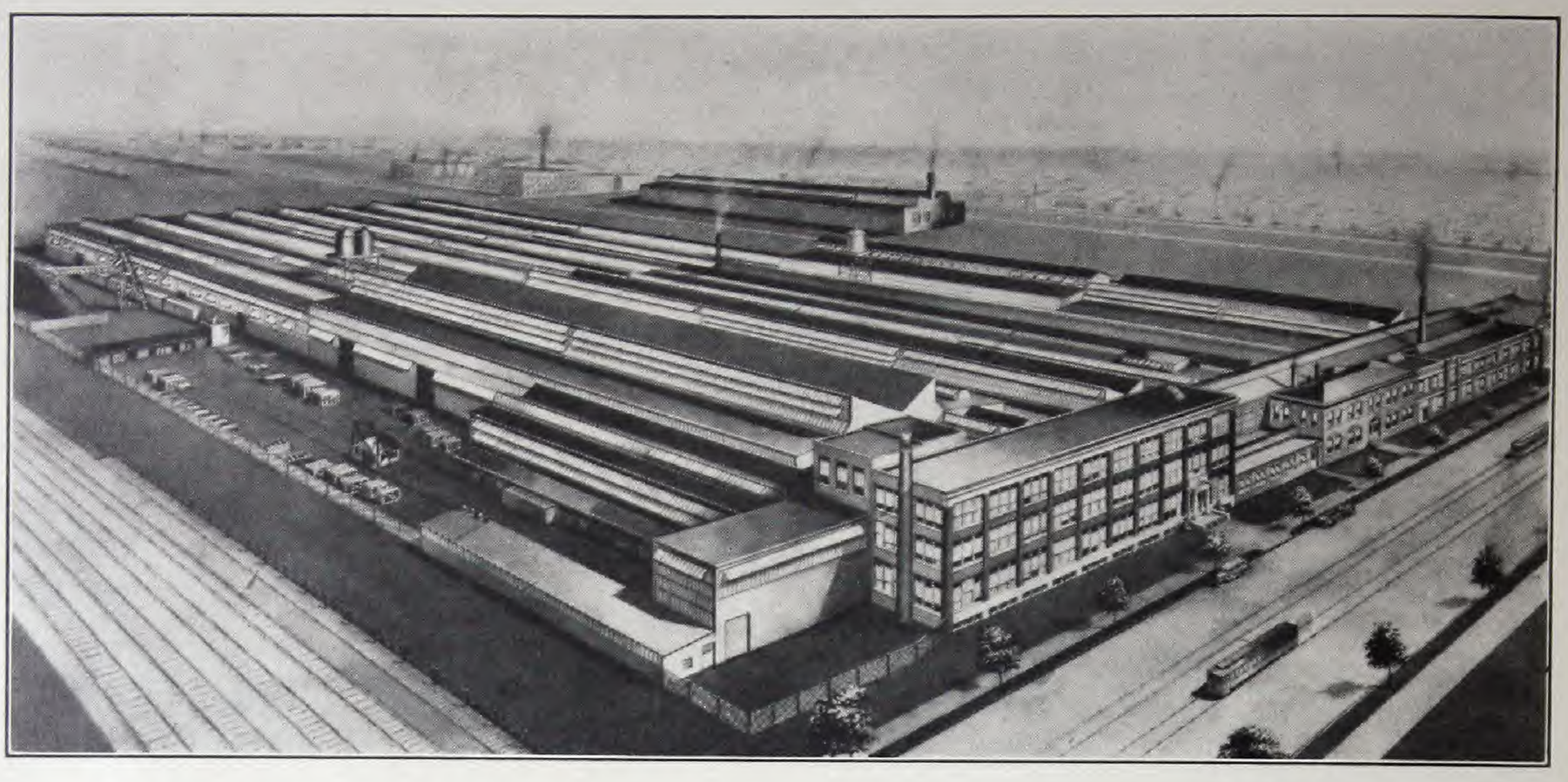
DAVID LUPTON'S SONS COMPANY

Allegheny Avenue and Tulip Street

PHILADELPHIA

Branch offices, agents and dealers in principal cities

THE LUPTON FACTORY, PHILADELPHIA



View above shows the main offices and factory of David Lupton's Sons Company in Philadelphia.

Eleven acres of floor space are devoted to the manufacture of quality steel products.

The lower view shows a typical interior in the factory, with a Pond Roof Design for the necessary good lighting and ventilation. Not only do we recommend Pond Continuous Sash and Pond Roof Design, but we use them because they represent the best practices in manufacturing building design.

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POND CONTINUOUS SASH

(Patented and Patents Pending by Clarke P. Pond)

The Original Continuous Sash

Pond Continuous Sash is a top-hinged steel sash, hung in horizontal lines outside the structural work or between the pilasters of a building. When open it resembles a continuous glass awning in a steel frame that can be lowered at will, moving in a circular arc about its top edge, where it is hinged to the building structure.

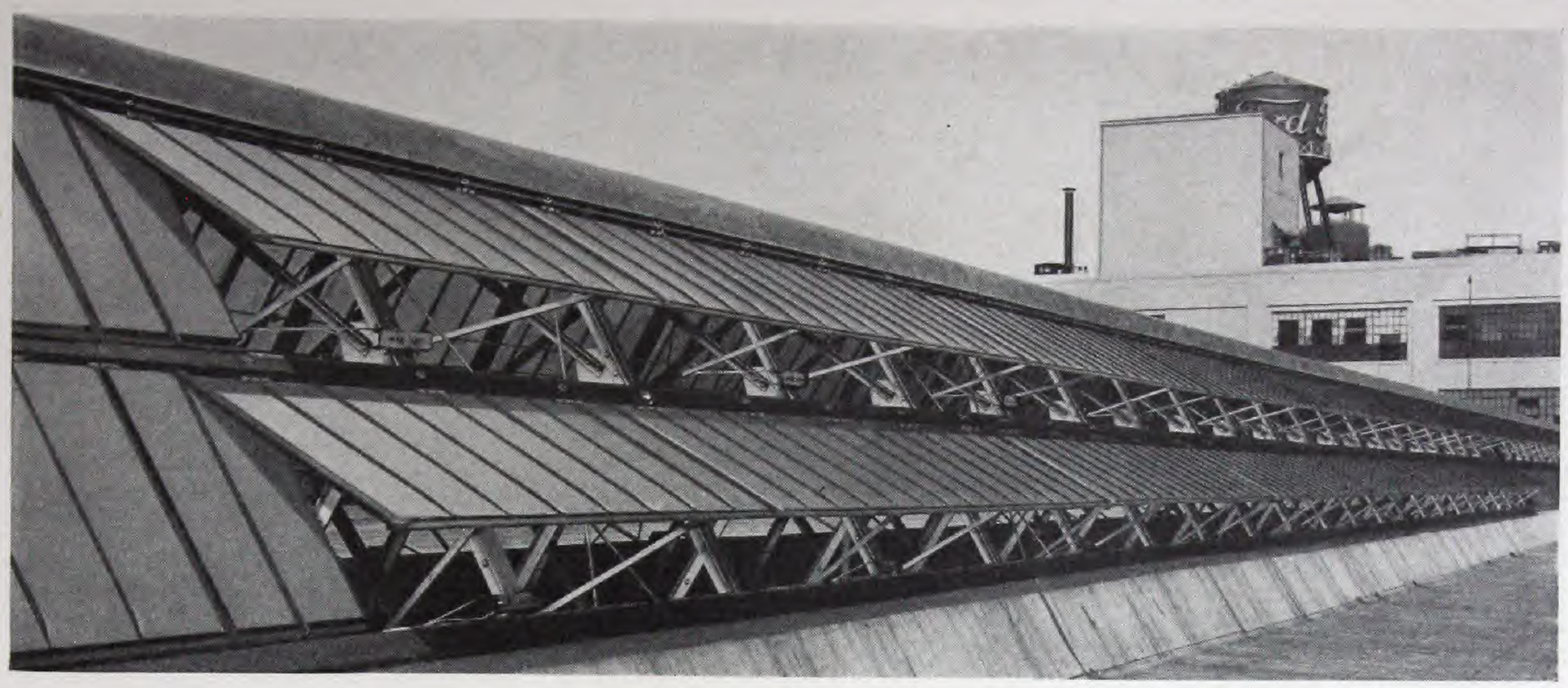
Besides furnishing natural illumination in a building, the outstanding advantage of Pond Continuous Sash is that it forms a translucent rain-proof shelter over a long opening, which may be left open for ventilation, regardless of weather conditions. Made up of standard length units connected by weather-proof expansion joints, its continuous runs overlap stationary glass storm panels at each end, thus preventing rain from entering at these points. Even though the sash is left open during a storm, this construction protects from the weather, equipment, goods, and materials in process. It permits ventilation in all weathers, and the sash need never be shut except for warmth.

In addition to this weather-protecting feature, Pond Continuous Sash gives a higher percentage of ventilation in proportion to the sash dimension than can be obtained with any other type of sash. This characteristic, together with the fact that it tends to deflect winds over the roof and avoid down drafts, and that its long runs may be easily opened or closed from a central control, make it particularly effective in plants having fumes or heat-producing processes, such as forge shops, foundries and glass plants.

Mass control is another feature of Pond Continuous Sash. By the use of Pond Operating Device, as much as 1,000 square feet of sloping sash, or 1,500 square feet of vertical sash may be controlled through one hand chain. With electric motors, the areas may be much greater, permitting all the sash in a large building to be opened or closed in a few minutes.

Through the combined weather protection and mass control it affords, Pond Continuous Sash has profoundly influenced the design of industrial buildings, permitting them to be made larger and at the same time, when properly designed, more hygienic and pleasant to work in. This sash makes practical the use of extremely wide and long structures, which heretofore have been impracticable because of inability to daylight and ventilate them properly. These larger areas under a single roof permit the more intensive co-ordination of processes and handling which results in marked increases in production.

Pond Continuous Sash, the original steel continuous sash, was first used in the roof of the Western Clock Company factory at La Salle, Ill., in Ford Motor Company's Machine Shop B, Detroit, and in the Cincinnati Milling Machine Company Machine Shop, Cincinnati, in 1909. It has always been built for service; not to a price. Continual observation of the sash in use has resulted in a constantly improved product. Sections are of dimensions suited to give the best results in long service. The whole design of the sash is such as to give the minimum exposure of metal to the weather, and the use of copper steel for the members makes them resistant to corrosion. All details



Photograph shows a Pond A-Frame in roof, with two lines of Pond Continuous Sash in the sides.

This is one of the several uses for this type of sash. Pen drawing shows the A-Frame in cross section.

are carefully planned for exclusion of rain when open, and for weather-tightness when closed.

Years of service have proved that there is a lower percentage of glass breakage in Pond Continuous Sash than in fixed skylights, as the flexibility of continuous sash prevents the glass from being fatigued or broken by the vibration of hammers or cranes. Also the method of hanging continuous sash, with integral expansion joints every 20 feet, prevents stresses being transferred to the glass by movement of the building or operation of the sash.

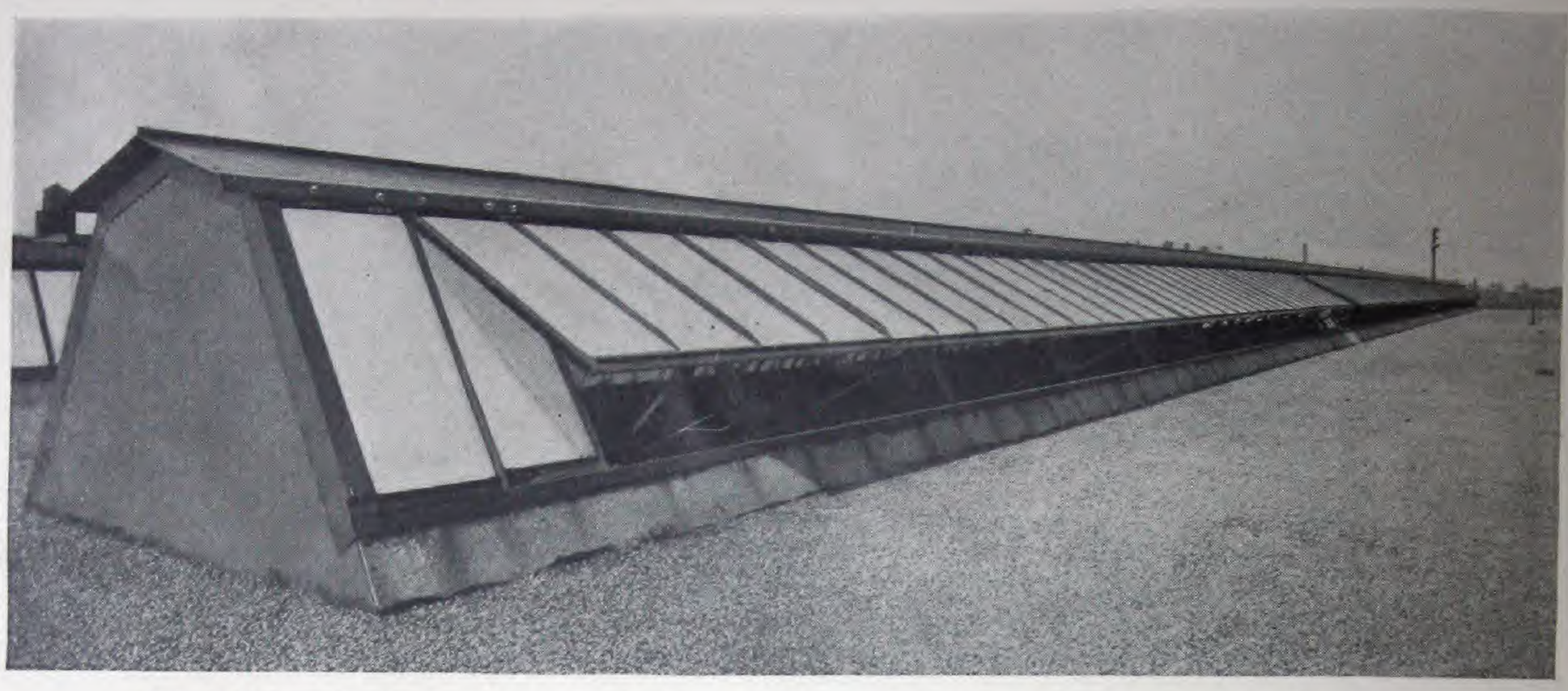
Originally designed for use in roofs, it is equally useful in side walls, where it may be used either as an outlet in multi-story buildings, or as a continuous inlet, permitting slow diffusion of fresh air without local drafts. Its most effective use is in connection with Pond Roof design and Pond A-Frames.

The most common roof and wall constructions in which this type of steel sash is successfully used are listed below.

1. POND TRUSS ROOFS. The Pond Truss Roof Design is described on pages 20 and 24. The position and slope of its roof planes carry rising air currents directly to large outlets hung with Pond Continuous Sash in long lines. These outlets cross-light the area beneath, giving abundant, almost shadowless illumination. "Spotty" ventilation is avoided by uniform openings and by having a portion, at least, of the sash in the side walls mass controlled by Pond Operating Device, so that inflow as well as outflow is uniformly distributed.

By filling the entire side walls with Pond Continuous Sash and making the outlet areas equal to the inlets, heat-producing buildings as wide as 250 feet can be effectively ventilated with but a single wide Pond Truss.

2. POND A-FRAMES. Pond A-Frames, carrying on each sloping side one or more runs of continuous sash, are useful for local daylighting and ventilating outlets in roofs of warehouses, garages and small miscellaneous buildings. They are also widely used in larger industrial buildings to admit fresh air and light through low roof sections between Pond Trusses. (See view and cross section above.)



A Pond A-Frame having but a single line of Pond Continuous Sash in the sides. The number of  sash lines in an A-Frame are determined by the nature of the users' requirements.

A-Frames are similar to narrow monitors except that they are more efficient and less expensive than the ordinary skylights with ventilators over courts and similar areas.

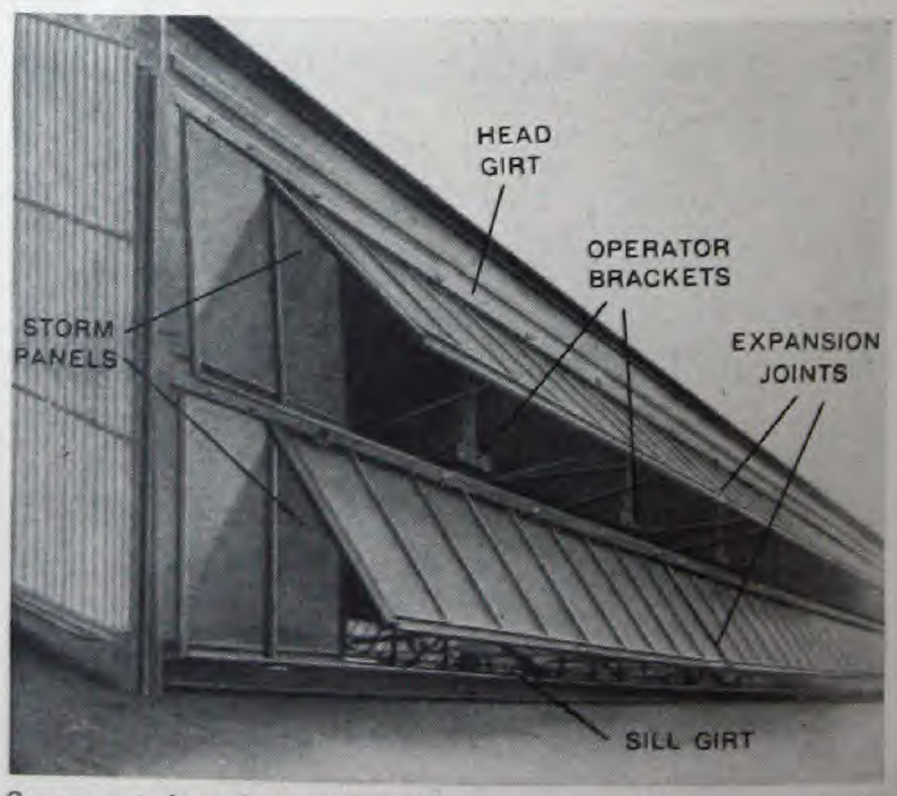
3. SIDE WALLS. In Pond Truss foundries and forge shops a large inflow is obtained by using Pond Continuous Sash in the side walls. By admitting fresh air along the entire length of wall, and allowing it to diffuse before reaching the floor, local drafts are avoided. The same principle applies to buildings for any purpose involving heat, fumes or gases. The sash may be run in long lines outside of columns, or in short lengths between pilasters, several lengths being controlled by one operating power.

4. SAWTOOTH ROOFS. While this form of roof is much less used today than it was some years ago, Pond Continuous Sash enables the sawtooth roof to show the best results of which it is capable. This sash permits uninterrupted ventilation during a rain with full protection for goods and equipment. Owing to its effective protection and easy control, sawtooth sash is best used on a 30 degree slope, thereby admitting about 50 percent more light for equal glass area than vertical sash would give.

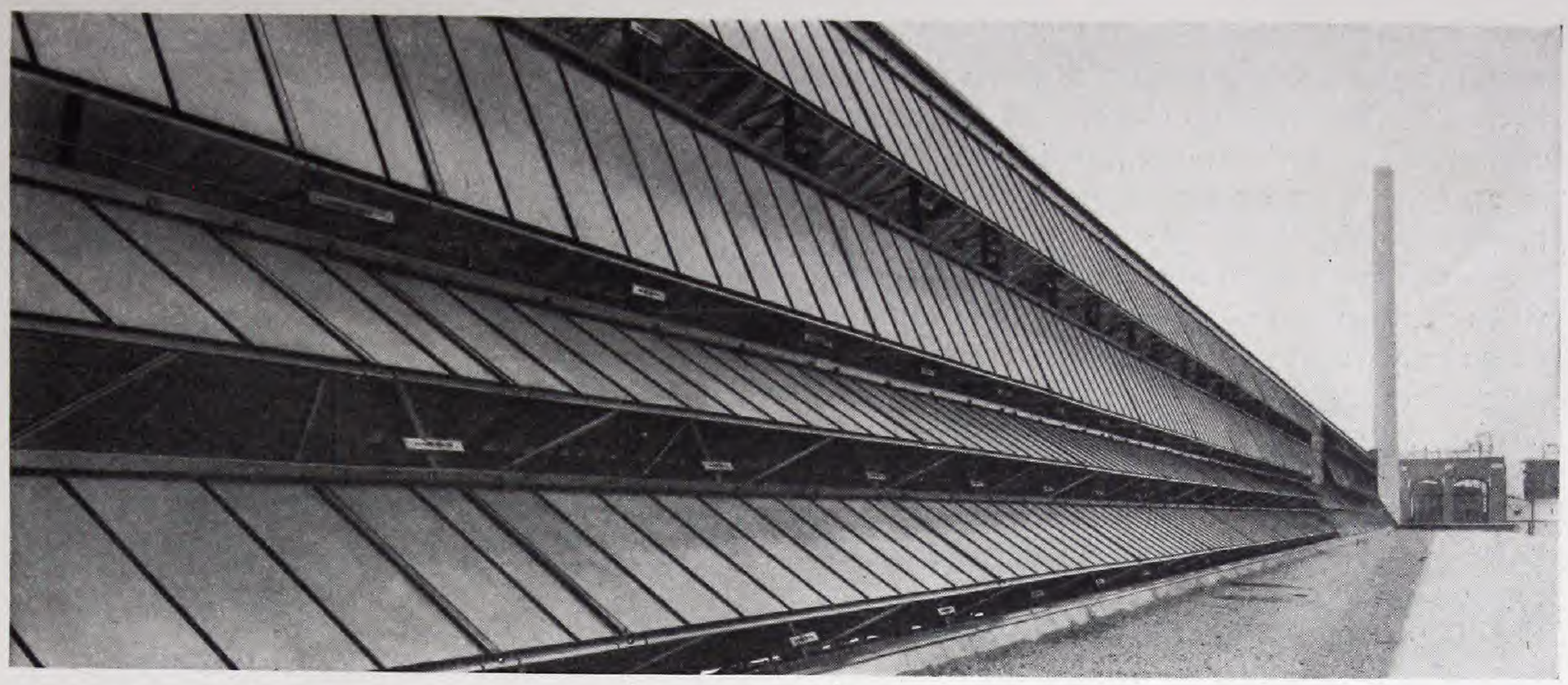
5. MONITOR ROOFS. Pond Continuous Sash is valuable in all roofs of this type, enabling full production to go on in any weather. Long runs of sash are preferable.

General Construction

Standard Units are 3, 4, 5 and 6 ft. high and 20 ft. long. To fill out ends of runs, units 10, 12, 14, 16 and 18 ft. long are used as needed. Each end unit in an operated line overlaps a stationary storm panel 2 ft. wide. At the head, the sash are hinged under a continuous angle girt which prevents rain from entering at the top and a similar girt forms the sill. Sash units are connected by integral expansion joints of special design, combining flexi-



Storm panels and structural features of Pond Continuous Sash.

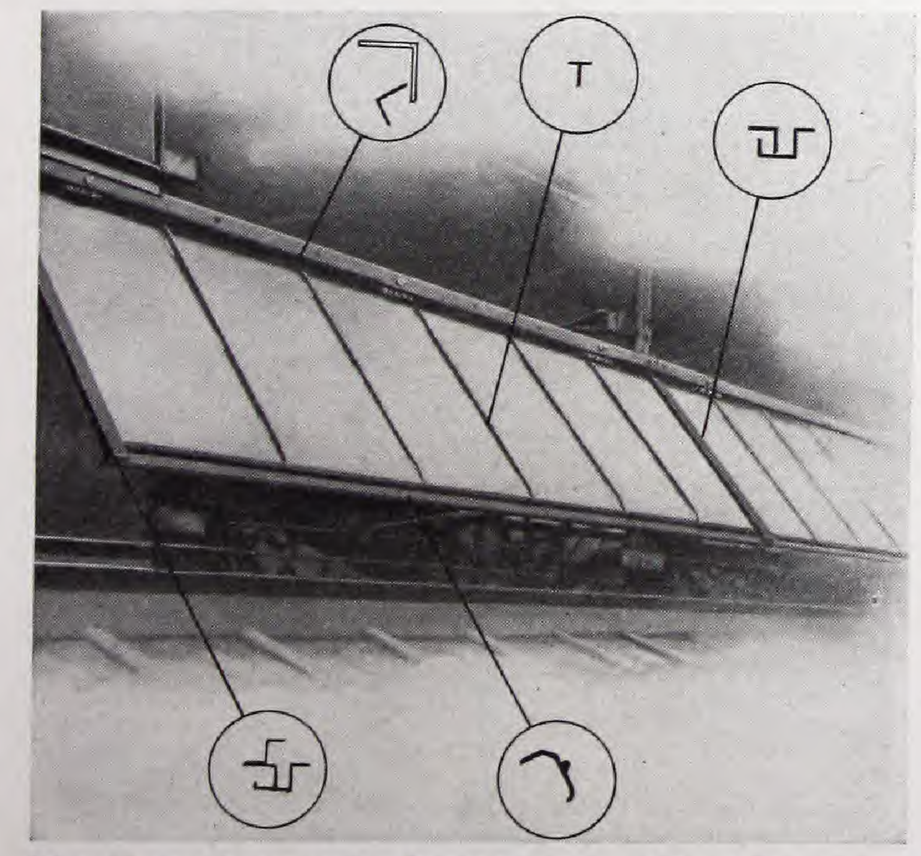


One side of a typical Pond Roof Design, with four lines of Pond Continuous Sash in the sides, two vertical and two on the slope.

Standard lengths of the sash are joined together into a single long line.

bility with minimum air leakage. All joints of sash are solidly oxy-acetylene welded. The maximum strength is obtained from all members as each section is solidly welded to the adjoining section, whereas, in riveted sash, the weakest joint represents the maximum strength of the sash.

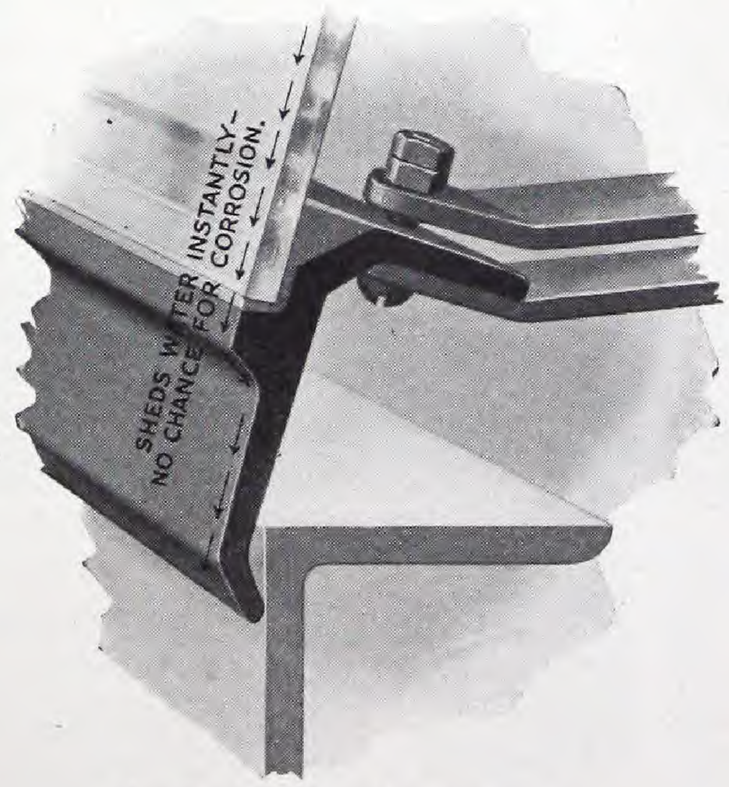
Standard and end units, also storm panels and operators, are carried in stock in our principal warehouses.



The five members used in the construction of Pond Continuous Sash. See page 14 for full size sections.

Members

Sash members are all one-piece solid copper steel sections and are shown full size on page 14. They are unusually substantial, and their extra strength is well justified by the resulting economy in maintenance.



Section No. 360, the sill member.

The sill member receives the thrust of the sash rods in opening the sash. It is specially rolled and it avoids the faults inherent in the Z-bar and similar forms when used for this

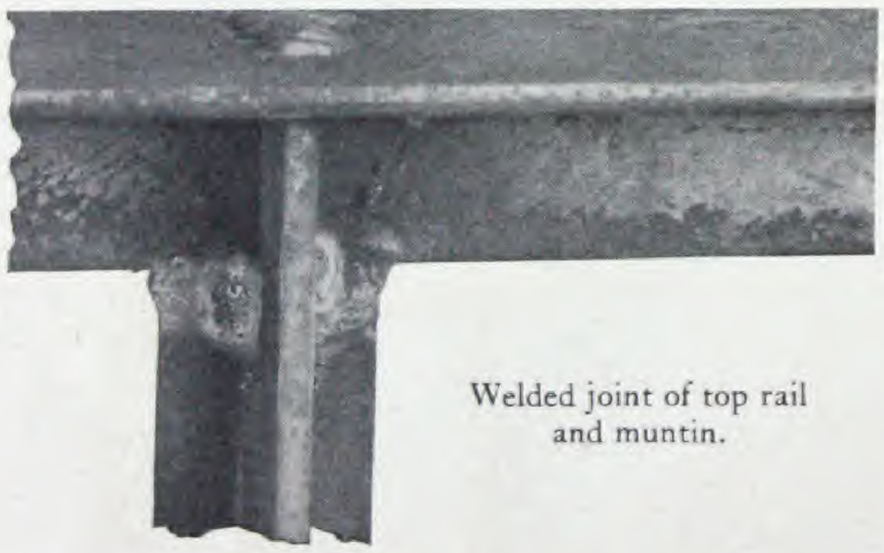
purpose. The outstanding leg being cut flush with the glass, this sill member gives free and immediate drainage, so there is no chance for corrosion to start. As continuous sash is held in an open position much more of the time than it is closed, and as the wider it is open the more it accumulates moisture and dirt when the bottom rail projects beyond the glass line, the advantage of this new patented flush sill member is obvious. The life of the sash is considerably lengthened by this perfected design.

The hinges have bronze pins. They are bolted to the overhead girt angle and to the top rail of the sash. When the sash are closed, the hinge action forces the top rail against the girt angle, minimizing air leakage at this point. This contact does not depend on a continuous bearing, which is of little value when the steelwork is not in perfect alignment with the sash.

The bottom rail laps the girt angle forming the sill, and is pulled up against it by the operating device, which is adjusted for that purpose during erection to compensate for unavoidable variations in sill alignment. Bottom rails of stationary sash are fastened to the sill by strap clips bent over the steel work; top rails are hinged as for operated sash.

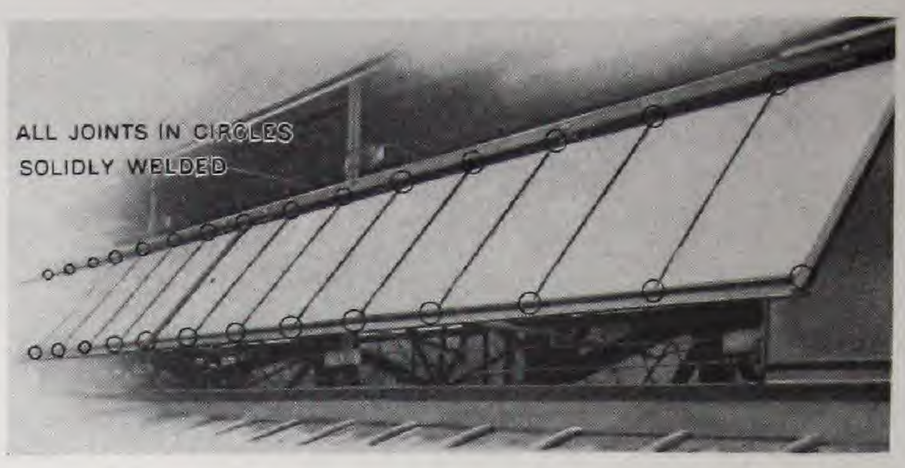
Welded Assembly

The welds at the joints of the sash are real welds. Each member, including the expansion



Welded joint of top rail and muntin.

cover, is welded to the attached members along their entire line of contact. Thus each unit becomes a single rigid piece; there is no possibility of the joints loosening later by racking or internal corrosion, with resultant glass breakage and cracked putty.



Welded assembly is more costly but is positive insurance against an unsatisfactory installation.

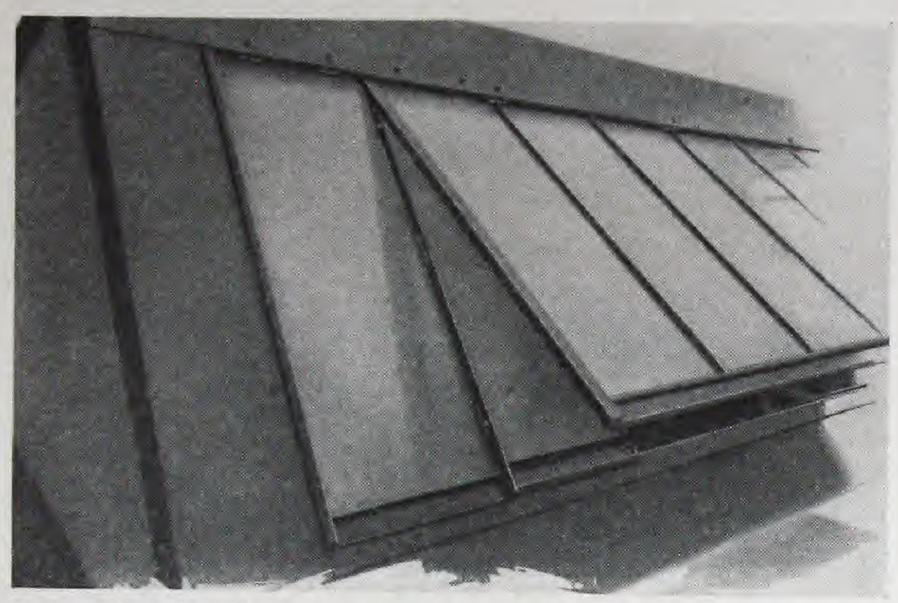
The Lupton method of welding is more costly than riveting or spotting hot metal here and there, and it is the customer's insurance of a long-lasting installation.

Storm Panels

Storm panels are used with operated lines in roofs, and with long operated runs in walls. Each storm panel is 2 ft. wide, under-lapping the end light in the operated sash, and is built in one piece with a stationary end panel extending 2 feet beyond the sash.

Close-up view of storm panel at end of a line of Pond Continuous Sash. This is always stationary.

Stationary lines of sash are usually arranged to meet a short (2-ft.) end panel; the storm panel being omitted. When this is done, the end panels may readily be replaced later by combination storm panels if the line is changed to an operated one. In order to do this, however, it is necessary that the stationary sash be hung from an overhanging girt angle.

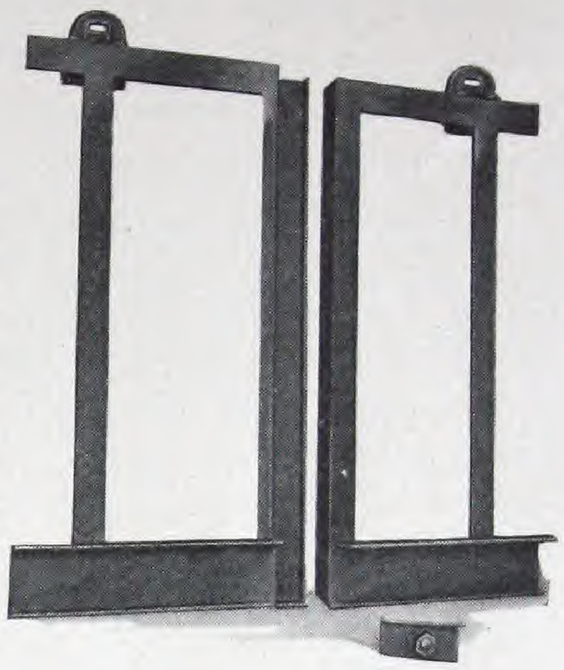


View showing how operated sash overlaps the storm panel, preventing the entrance of weather.

Both the stationary end panels and the combination storm panels require flashing. See under "Flashings," page 12. End units are glazed in the same manner as the sash units.

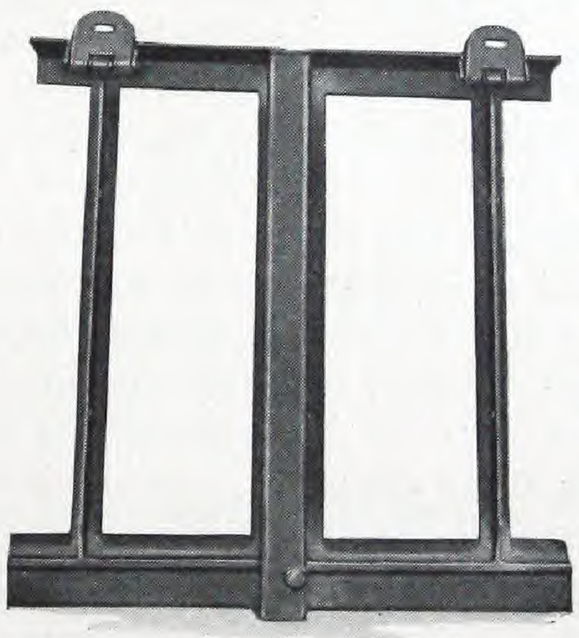
Expansion Joints

Expansion joints are necessary to long lines of continuous sash. Their function is to take care not only of unequal expansion, but also of unavoidable inequalities in the steel work. A certain degree of flexibility of the sash, both in its own plane and at right angles thereto, is necessary to avoid glass breakage and loosening of putty. No such flexibility exists when units are rigidly bolted together; and if the bolted joints are located under the glass lights, the slightest flexure there tends to break the glass.

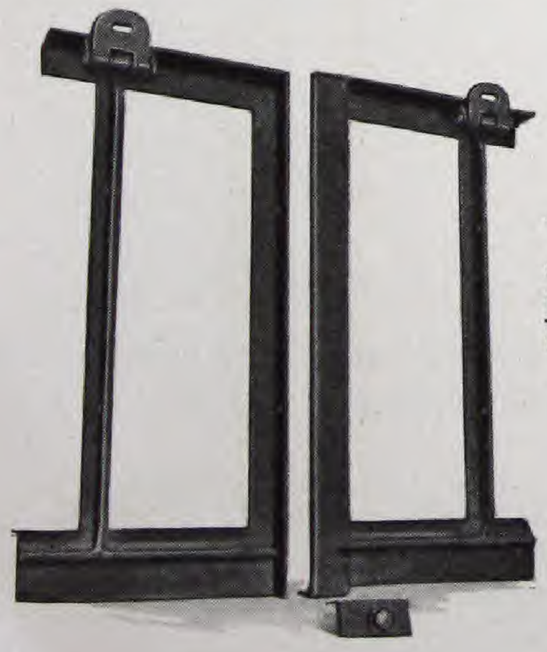


This view shows the inside of the expansion joint before attaching to the sash.

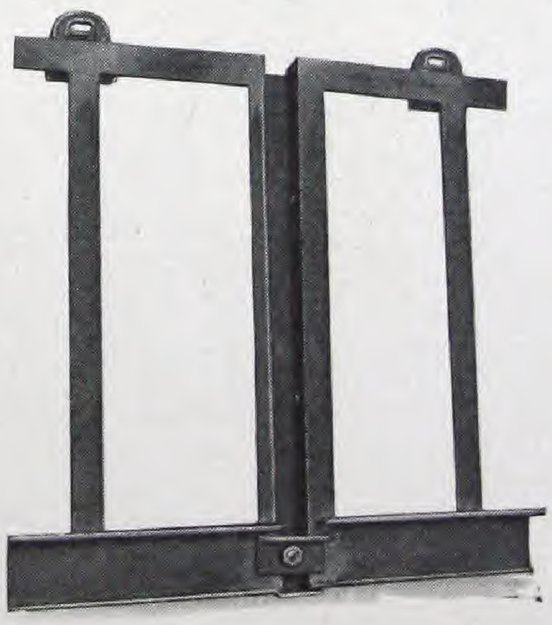
Joints between units of Pond Continuous Sash are so designed and located as to have all



An outside view of sash and expansion jointattached. Flexibility is possible by the method of making connection at the bottom.



View from outside, showing expansion joint before attaching by means of the angle plate in foreground.



Inside view, showing the angle plate used in attaching expansion joint to the sash.

needed flexibility without the slightest strain on glass or putty. They give ample flexibility in *both* planes. The joint cover is an integral part of one sash section; hence there is only one lap contact—with its chance of air leakage—instead of two, as would be the case with a loose cover.

This is the most expensive form of expansion joint used in continuous sash. We use it because it assures to the customer the durability, the freedom from glass breakage, and the security from leakage to which he is entitled in high grade sash.

For Use in Side Walls

Pond Continuous Sash may be used in walls in two ways. The first way is to use it as in roofs, i. e., in long continuous runs outside of steelwork. This construction is frequently used in foundries and similar buildings. When this is done, combination storm panels and short end panels are used as in roofs—the former for operated lines, the latter (usually but not necessarily) for stationary lines.

The second way is to use it in short lengths between pilasters, the lengths being connected in lines or groups for simultaneous control by Pond Operating Device. For this purpose, stationary end panels are omitted, and the end rails are shaped to lap special plate weathering set into the masonry. This weathering must be carefully located in the plans and attached to the steelwork by the general contractor before the jambs are built.

When used in long runs, standard units are always employed. For use between pilasters, special lengths can be furnished if necessary, with special glass widths but standard heights.

For power house walls, a special construction is used. See separate catalogue chapter on this type.

Standard Dimensions

Standard units are 20 ft. long. Shorter lengths, 10, 12, 14, 16, 18 ft. long, are carried in stock and used at the ends of runs as needed to suit the openings.

In roofs, combination storm panels are used with operated lines; with stationary lines short end panels are used. Either type of panel extends 2 feet beyond the sash, usually to the approximate center line of a truss.

Dimensions from out to out of these panels are always even feet; no odd feet nor inches. To these even feet dimensions must be added not less than 1½ inches at *each* end (more if desired) for clearance and end flashings. Thus opening lengths are expressed as 84 ft., 3 in.; 136 ft., 3 in.; etc. Clearances exceeding 1½ inches at each end must be filled out with additional flashing.

Sash heights are 3, 4, 5 and 6 feet, no inches. Clear heights of opening, from head girt to sill girt for any sash, are 1½ inches less than the sash height. These heights must be carefully maintained.

In the side walls between pilasters, special widths of sash and glass are sometimes necessary. The end rails of such sash are formed plate, which overlap special plate weathering furnished by us. Width of opening is specified by architect. Weathering is of standard overall width (5½ in.) and is located to project from the masonry from 1½ to 3½ in. This gives an allowable variation in sash width of 4 inches and saves needless glass cutting.

Weathering is set in pilasters by general contractor before the face brick or concrete is applied. We furnish a sketch showing its location and that of the two holes to be punched by the general contractor in the head girt angle to carry it.

Standard openings of Pond Continuous Sash with Pond Operating Device are as follows:

3′ high top-hung continuous sash 46° or 28″
4′ high top-hung continuous sash 47° or 38″
5′ high top-hung continuous sash 42° or 43″
6′ high top-hung continuous sash 36° or 44″
Wider openings only when specified.

These standard openings will provide good ventilation and weather-protection when open.

Standard Glass Sizes

Standard glass heights are three inches less than the standard or overall heights of the sash, i. e.:

No. 3 sash 3′ high.....33″
No. 4 sash 4′ high.....45″
No. 5 sash 5′ high.....57″
No. 6 sash 6′ high.....69″

Standard lights are 23 and 24 inches wide, these widths being combined as needed to make the desired length of sash.

In ordering glass for replacement, the width and height for *each light* must be specified.

In ordering new sash, only the nominal length of the units need be specified.

Pond Operating Device

The operating device for control of Pond Continuous Sash is an important essential in the success of the latter. Pond Operating Device, which is always recommended for use with this type of sash, is fully described on pages 33 to 43.

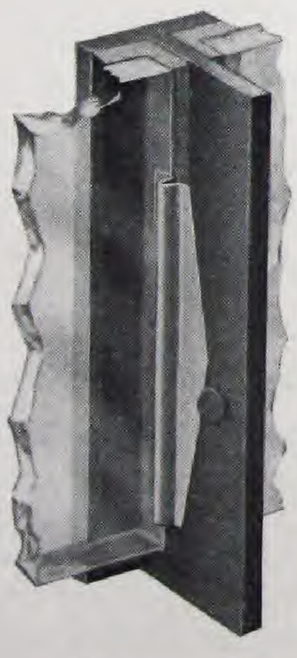
Warehouse Stocks

Standard units and end lengths, standard end panels for stationary sash, standard combination storm panels for operated sash; also standard Pond Operating Device, both hand and motor driven types, are carried constantly in stock in our Chicago, Cleveland and Philadelphia warehouses. Immediate shipments can be made of any reasonable quantity.

Erection and Glazing

Glass of one-quarter inch thickness is always used. In roofs, vertically ribbed wire glass, one-quarter inch thick, should be employed. The ribs should be placed on the side least exposed to dust.

Lights are bedded in a special putty, which retains a degree of plasticity indefinitely. Putty is struck flush with the outer surface of the glass—not V-puttied—and the lights are securely held by clips of galvanized pressed steel.



Views at left show method of glazing Pond Continuous Sash. The glazing wedge is used at the sides of the lights.

Pond Continuous Sash should always be erected and glazed, and Pond Operating Device erected and adjusted, by our skilled mechanics, to insure perfect working.

Structural Work Required

VERTICAL SUPPORTS (angles, channels or tees) for attaching brackets of operating device.

For sash 5 or 6 feet high, the center to center spacing of supports should not be less than 7½ ft. nor more than 16 ft.; for sash 3 or 4 feet high, the spacing should not be less than 6½ ft. nor more than 15 ft. (Trusses on 20 ft. centers, with one intermediate, usually make the most economical arrangement for steelwork.)

A CONTINUOUS GIRT ANGLE AT THE HEAD, to which the sash hinges are bolted. This angle should not be smaller than 3 by 3 ins., ¼ to ⅜ in. thick.

A CONTINUOUS MEMBER AT THE SILL. The face of this girt (usually an angle or a channel) should be in the same plane as the face of the girt angle at the head.

A CONTINUOUS GIRT ANGLE BETWEEN UPPER AND LOWER LINES OF SASH WHERE BOTH LINES ARE TO BE OPERATED. This member should be the same

Steelwork required to support sash and operating device.

size as girt angle at head when sash above and below are both vertical or both sloping, but when sash above is vertical and sash below is sloping, the leg to which hinges for lower sash are bolted, should be at least 4 in. long. All sash, whether operated or stationary, must have girt angles. Where sash is fixed, clips are added at the sill and storm panels are not furnished. A fixed line can be made to operate by adding storm panels at the ends.

All girt angles must be flashed by sheet metal contractor. See "Flashings," on this page.

We do not furnish structural work, nor do we punch the girt angles for hinges. See page 19 for these punchings.

Clearances Required

Clearances for hinges, overlap at sill, and operators must be strictly maintained. They must be kept free of rivets and other obstructions. All structural steel supporting sash must be straight and true, and must be directly attached to steel columns to avoid faulty alignment due to use of brick walls for support. See details, pages 15, 16, 18, 19, 38 and 39.

All estimates are based on our standard construction as shown in details. Extras will be charged for any special construction necessitated by departure from dimensions and clearances here indicated.

Flashing required at joints of all girt angles.

Flashings

All joints in sill and intermediate girt angles; also all combination storm panels for operated sash, and short end panels for stationary sash, require flashings as shown by details on pages 16, 17 and 19.

We do not furnish these flashings; they should be supplied by the sheet metal contractor. We will not be responsible for the weatherproofness of Pond Continuous Sash where flashings are omitted.

Sash between pilasters require special end weathering in jambs which we furnish. See Detail on page 18 for dimensions needed, covering both sash and weathering.

Work Not Included by Us

We do not furnish any of the girt angles or supporting structural work named under the head of "Structural Work Required." We do not punch the girts or structural work for the support of sash or operating device, but furnish complete drawings showing all details and punchings. This work should be done by the steel contractor. We do not include with the sash any flashings at head, joints in girts, sill or ends, or any roof connections. See above under "Flashings."

Top-Hung vs. Center-Pivoted Continuous Sash

The attempt is sometimes made to avoid the obvious fault of pivoted ventilators for roof use (i. e., the fact that the gaps between them admit rain) by joining them into a continuous line. We were the first to make center-pivoted continuous sash, having furnished 70,000 square feet of it in 1909 to the Pullman Co. for their steel freight car plant at Pullman, Ill. While we make this type on special order, because of its inherent deficiencies we do not recommend it.

Specifications

All continuous sash as shown on drawings shall be Pond Continuous Sash made by David Lupton's Sons Co., Philadelphia.

Construction

All sash members shall be one-piece solid copper steel sections with patented bottom rail No. 360. This bottom rail shall have its outstanding leg flush with the glass, to shed water and dirt. Storm panels at ends of all operated sash (when furnished) shall be made of No. 14 gauge steel plate. Expansion joint covers shall be integral with sash units and provide for ample expansion or contraction of sash units. All sash and storm panel joints shall be solidly oxy-acetylene welded. Bolted or riveted assembly will not be permitted. Sash shall be hung on malleable iron hinges with heavy bronze pins.

Jamb Weathering in Walls

Where sash extends between pilasters, jamb weathering of No. 12 gauge formed steel plate is to be furnished (but not erected) by sash contractor.

Painting

All sash shall receive one shop coat of sash manufacturer's standard paint, oven dried.

Erection

All continuous sash shall be erected by sash contractor. (Jamb weathering for sash between pilasters, however, will be erected by the general contractor.)

Glazing

All sash shall be glazed by the sash contractor with (kind and thickness of glass). Glass shall be bedded in special "P. C. S." putty, struck off flush with outside glass surface. Litharge or other sidewall sash putty will not be approved. Glass shall be held in place by clips permitting ordinary expansion and contraction.

Flashings and Collateral Steel

NOTE: The following clauses should be inserted in other specifications to cover work incidental to continuous sash but NOT furnished or installed by the sash contractor.

Structural Work

Structural steel members to come in contact with the continuous sash shall have straight parallel lines. Where there is a deflection, structural members shall be straightened in the field by structural steel contractor before sash are erected.

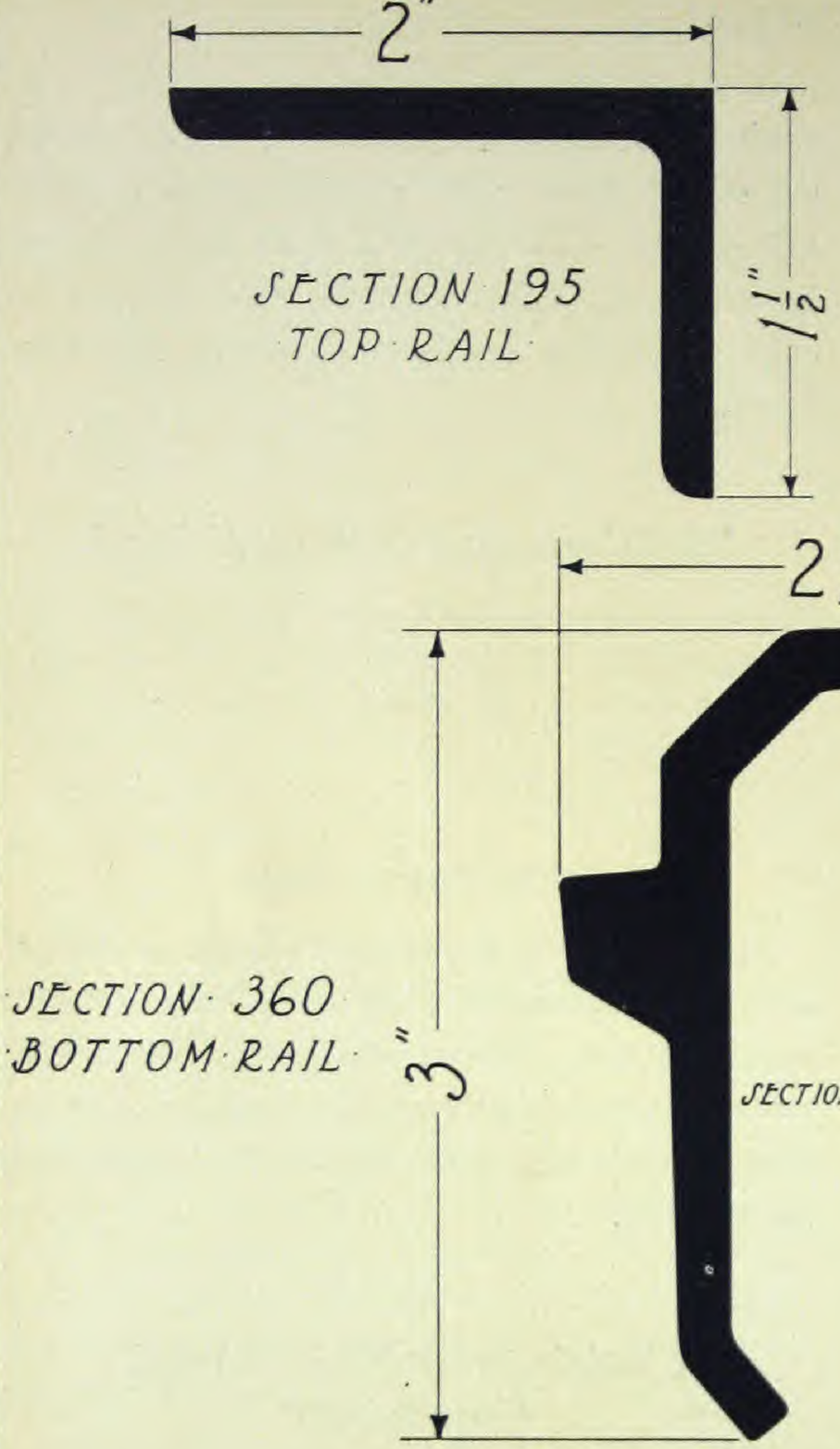
Flashings by Sheet Metal Contractor

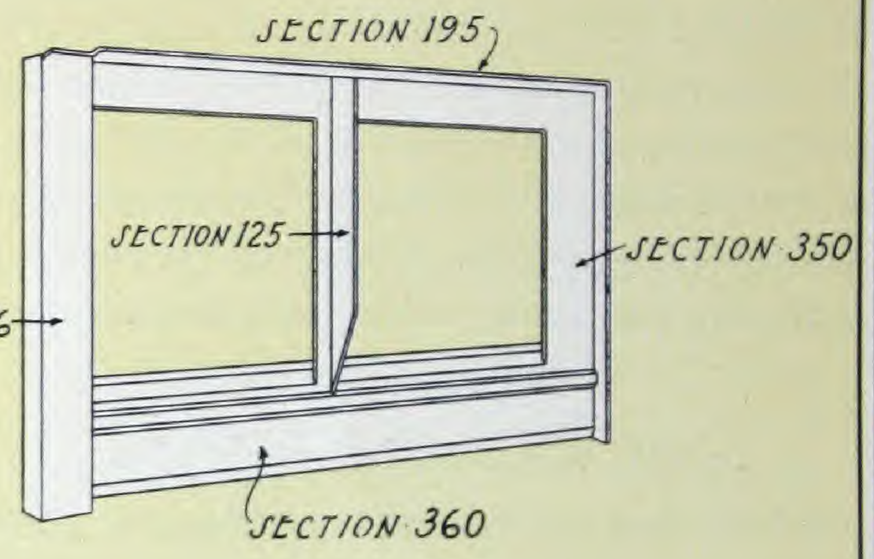
All sheet metal flashings at head, sill and jambs of openings, also flashings required at joints of and over gaps between ends of girts, shall be of material and gauge noted on plans, and shall be furnished and installed under this contract.

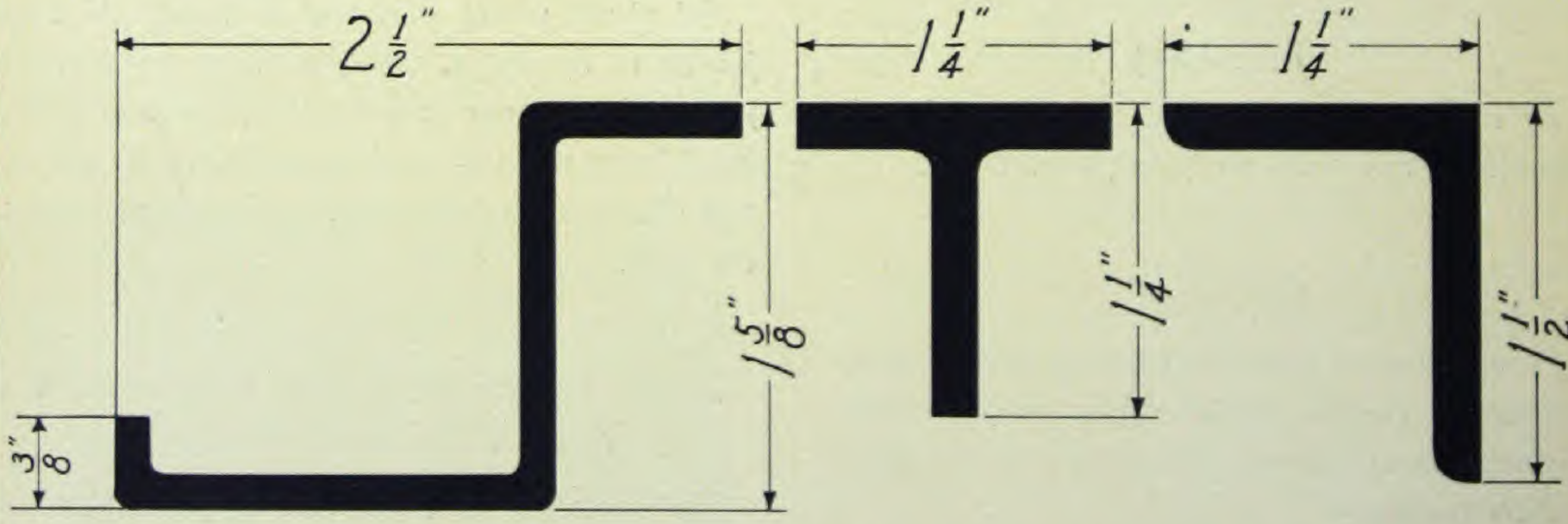
Jamb Weathering for Continuous Sash Between Pilasters

Plate weathering (furnished by the sash contractor) for jambs of continuous sash hung between pilasters shall be attached to the structural work in its correct location by the General Contractor before jambs are constructed.

SASH SECTIONS FULL SIZE







SECTION 326
OVERLAPPING END RAIL

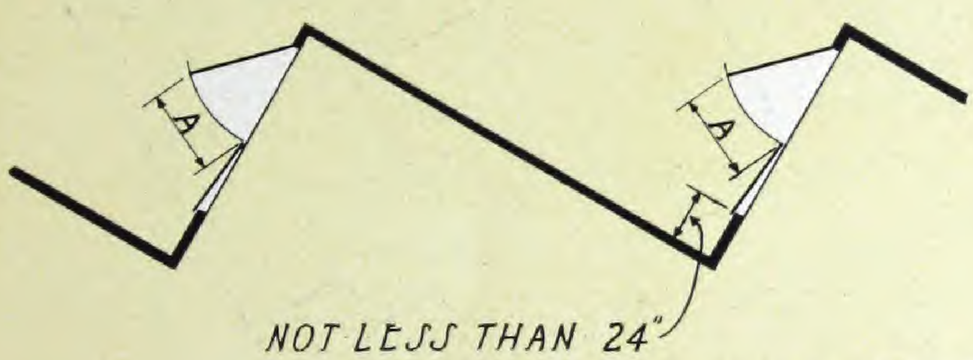
SECTION 125
MUNTIN

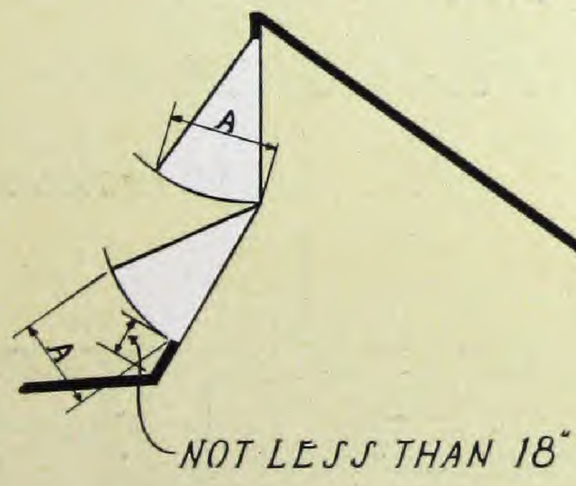
SECTION 350
END RAIL

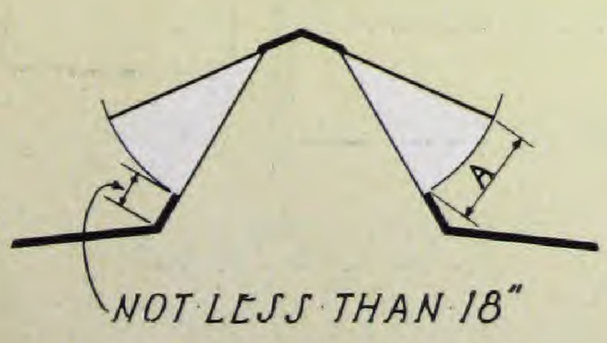
VERTICAL & SLOPING SASH DETAILS

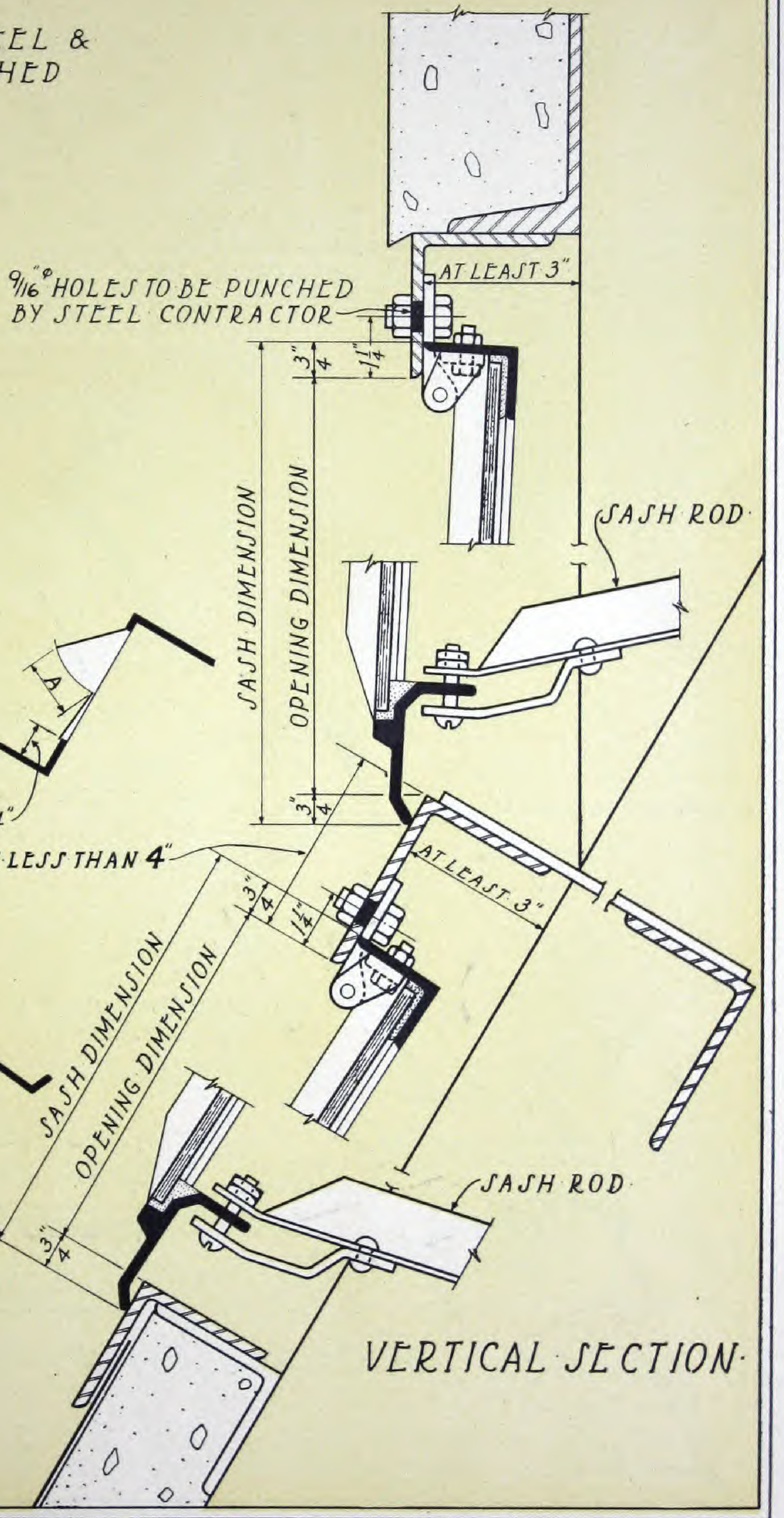
NOTE:- STRUCTURAL STEEL & FLASHING **NOT** FURNISHED BY LUPTON

TABLE OF STANDARD SASH & OPENING DIMENSIONS		DISTANCE SASH OPENS WITH POND OPERATING DEVICE
SASH DIM.	OP'G. DIM.	
3'-0"	2'-10½"	"A" = 2'-4"
4'-0"	3'-10½"	"A" = 3'-2"
5'-0"	4'-10½"	"A" = 3'-7"
6'-0"	5'-10½"	"A" = 3'-8"







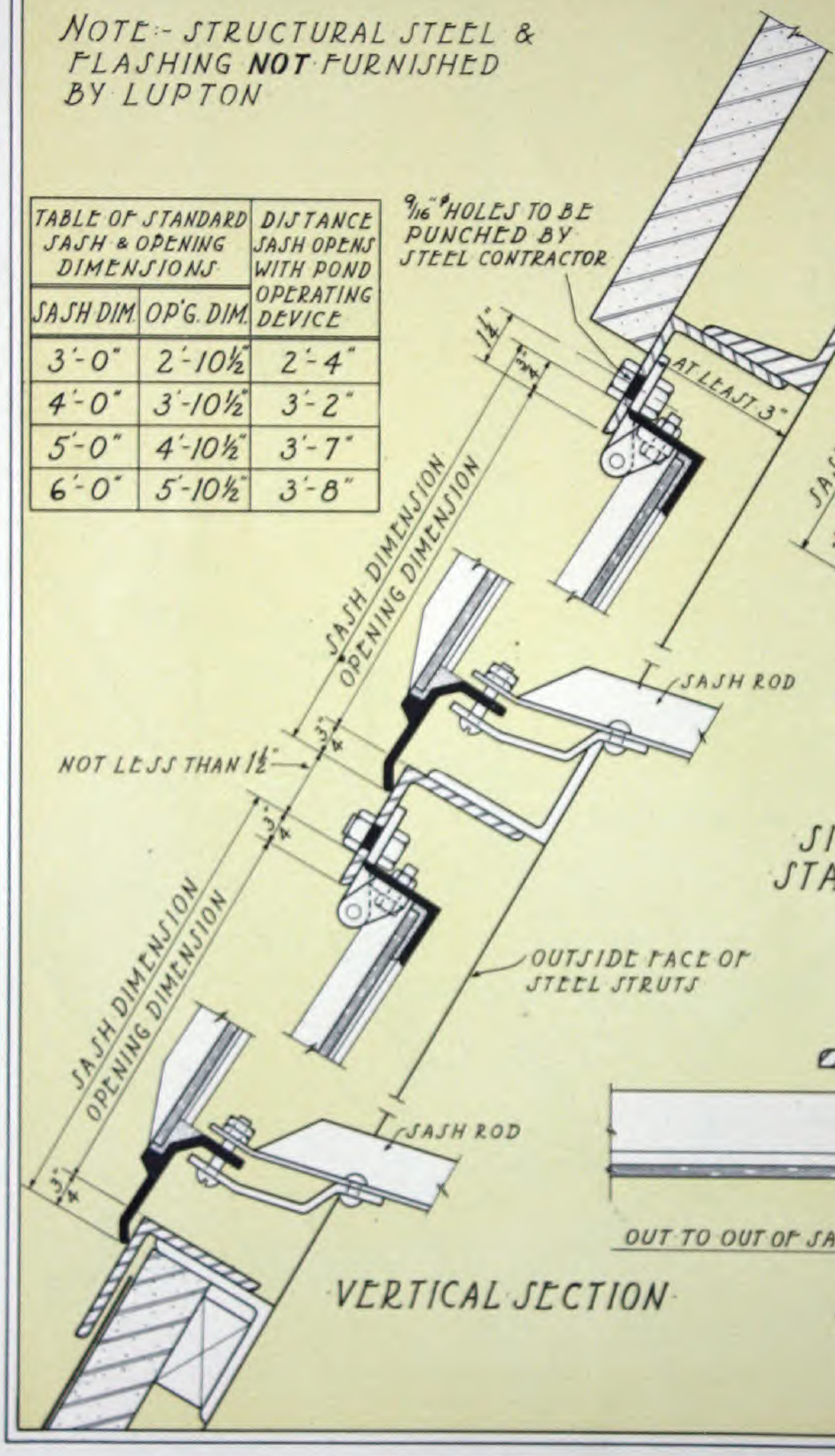


VERTICAL SECTION

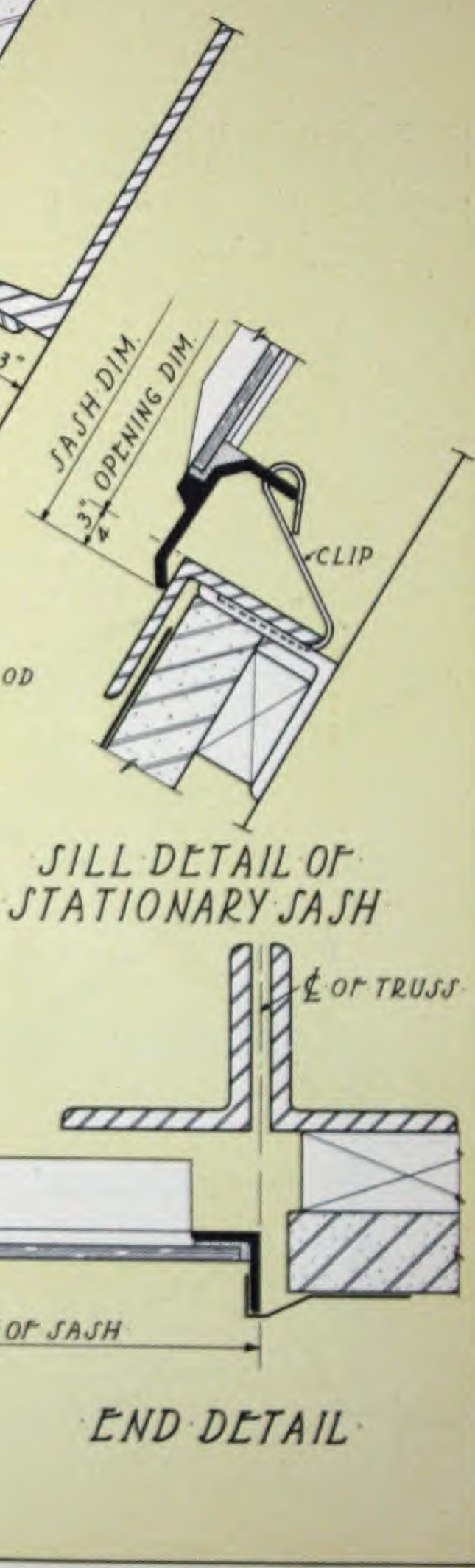
SLOPING SASH DETAILS

NOTE:- STRUCTURAL STEEL & FLASHING **NOT** FURNISHED BY LUPTON

TABLE OF STANDARD SASH & OPENING DIMENSIONS		DISTANCE SASH OPENS WITH POND OPERATING DEVICE
SASH DIM.	OP'G. DIM.	
3'-0"	2'-10½"	2'-4"
4'-0"	3'-10½"	3'-2"
5'-0"	4'-10½"	3'-7"
6'-0"	5'-10½"	3'-8"



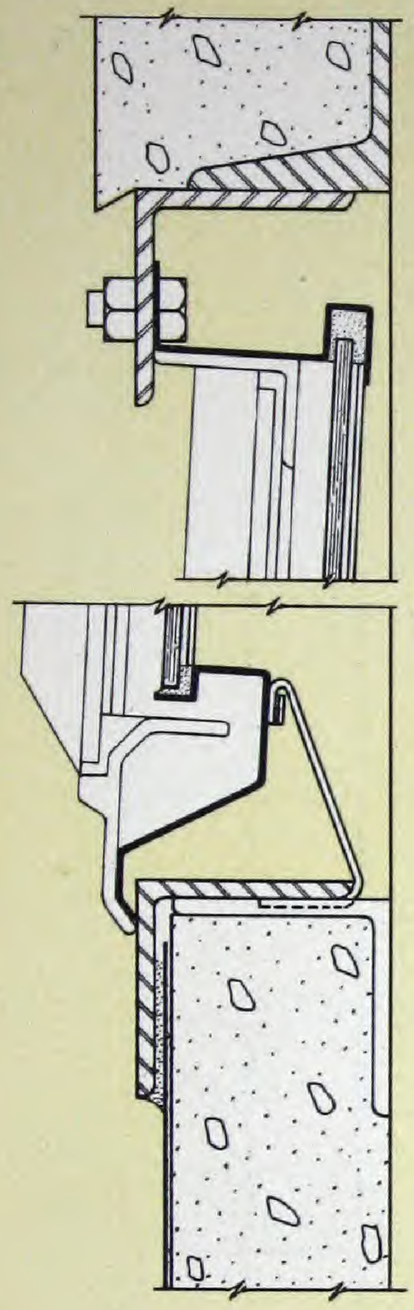
VERTICAL SECTION



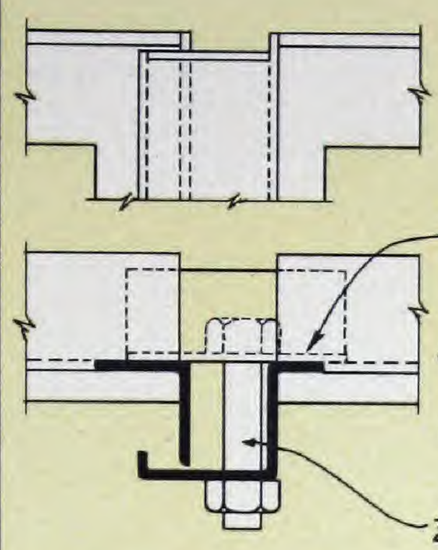
SILL DETAIL OF STATIONARY SASH

END DETAIL

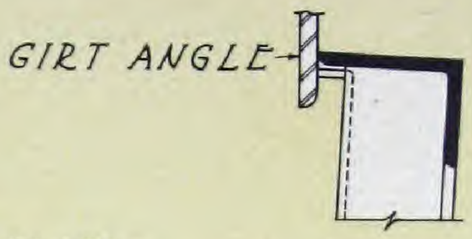
STORM PANEL & EXPANSION JOINT DETAILS

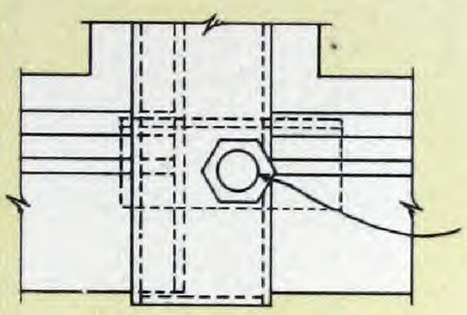


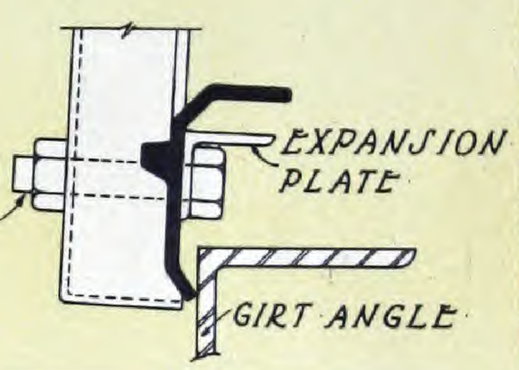
SECTION "B"-"B"

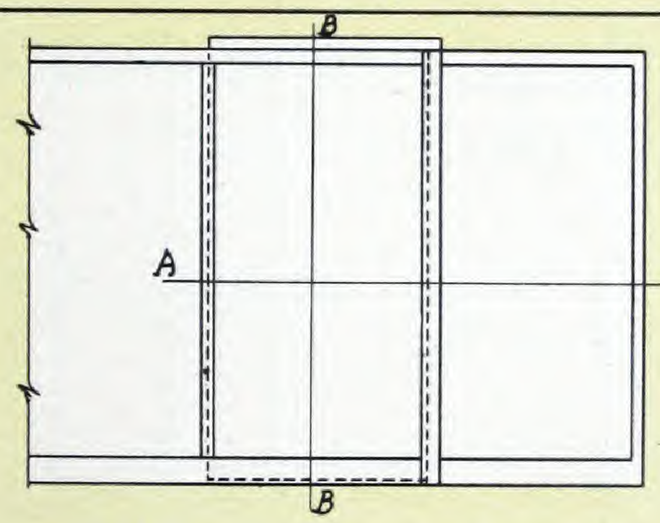


DETAILS SHOWING EXPANSION JOINT BETWEEN POND CONTINUOUS SASH





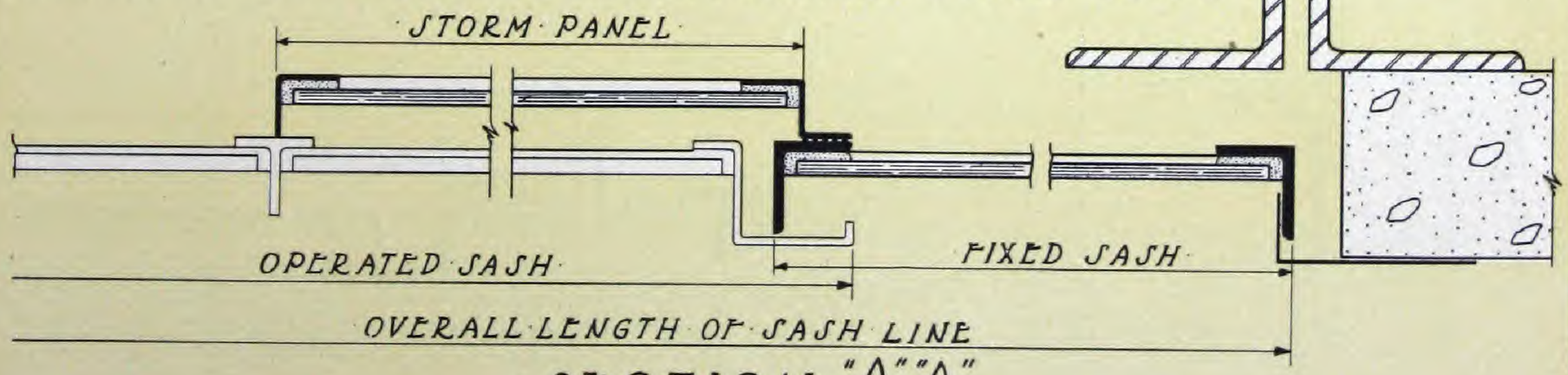




NOTE:-STRUCTURAL STEEL & FLASHING **NOT** FURNISHED BY LUPTON

ELEVATION

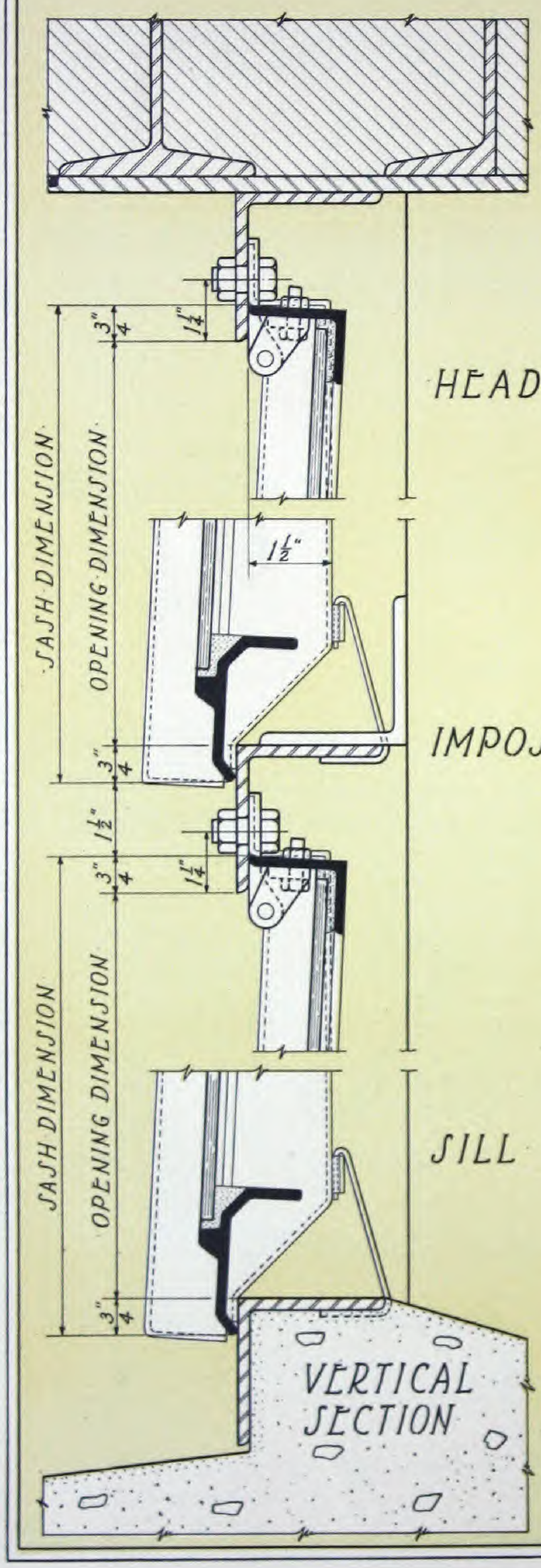
DETAILS OF COMBINATION STORM PANEL & FIXED SASH



SECTION "A"-"A"

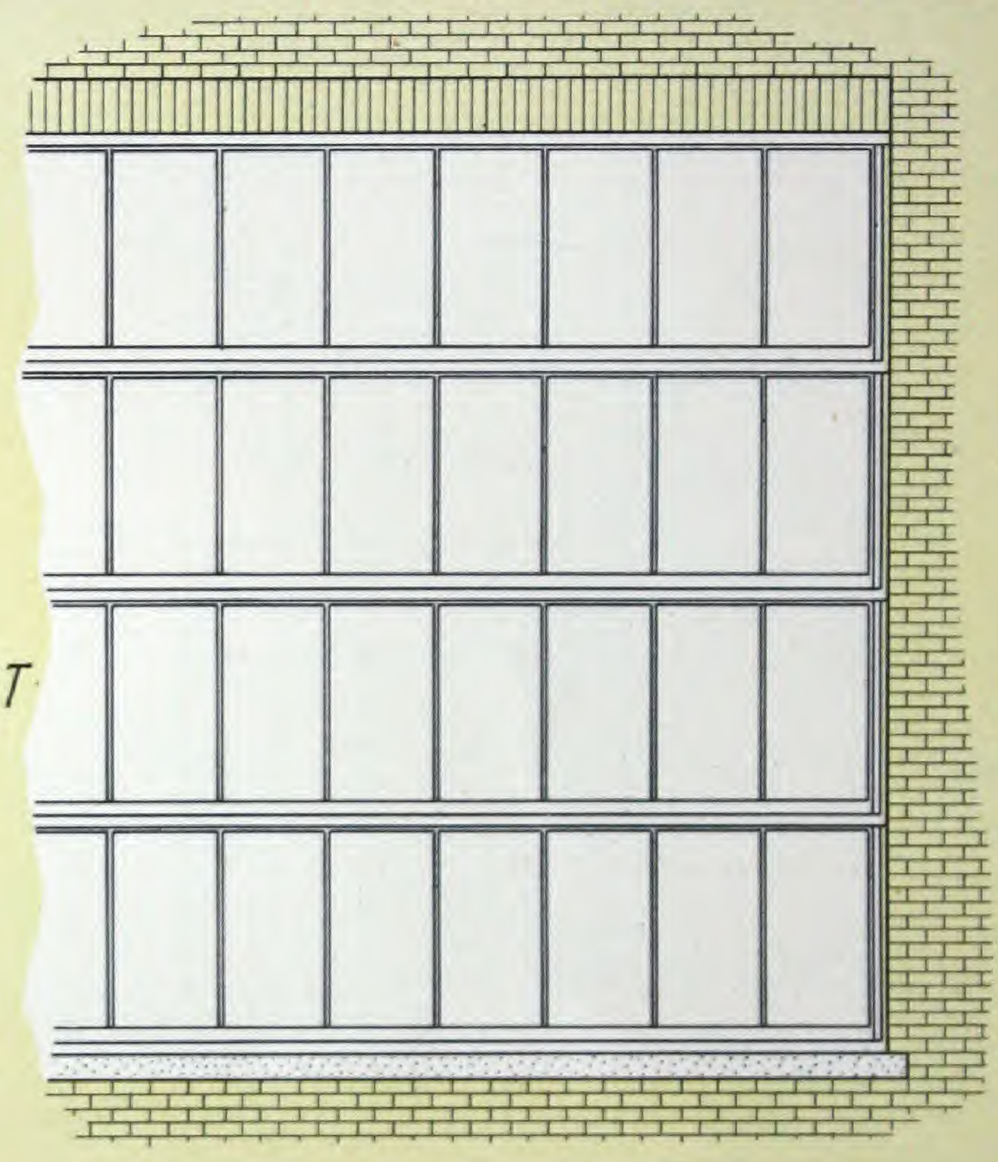
NOTE:-OVERALL LENGTH OF SASH SHOULD ALWAYS BE EVEN MULTIPLES OF 2'-0". IF EVEN FEET DIMENSIONS ARE NOT MAINTAINED SPECIAL END SASH ARE REQUIRED, DELAYING SHIPMENT OF SASH

SIDE WALL SASH DETAILS

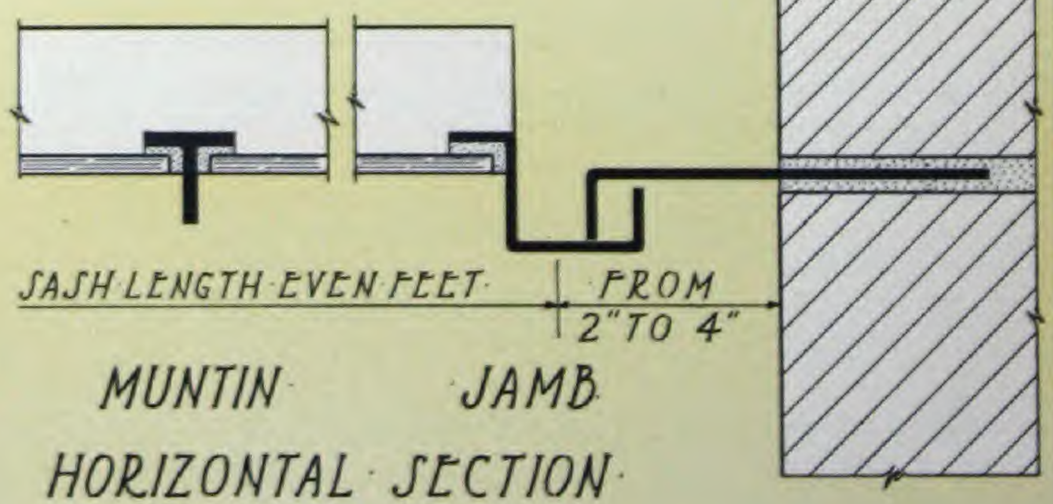


NOTE:- STRUCTURAL STEEL & FLASHING **NOT** FURNISHED BY LUPTON

TABLE OF STANDARD SASH & OPENING DIMENSIONS	
SASH DIM.	OP'G. DIM.
3'-0"	2'-10 1/2"
4'-0"	3'-10 1/2"
5'-0"	4'-10 1/2"
6'-0"	5'-10 1/2"



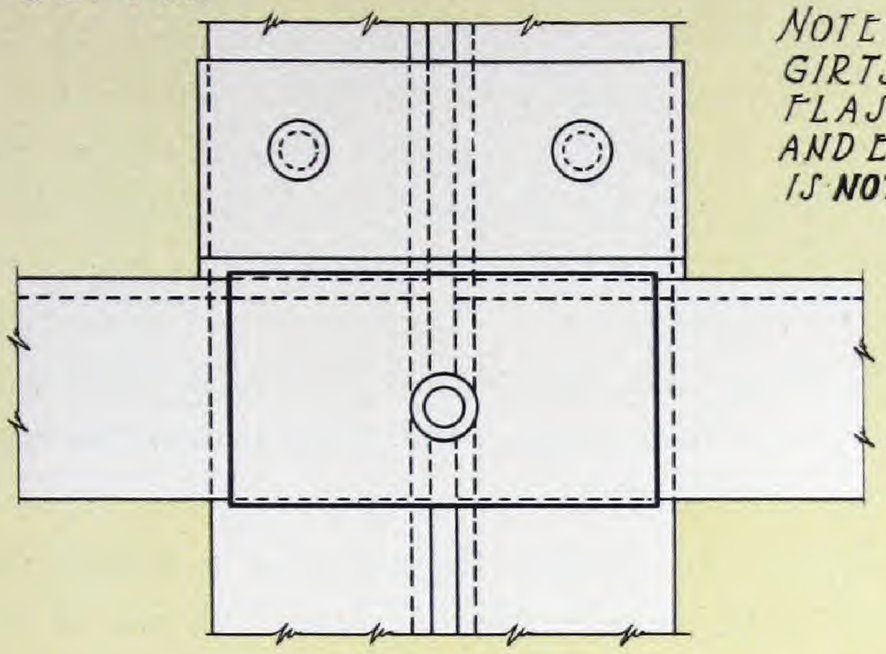
ELEVATION



HORIZONTAL SECTION

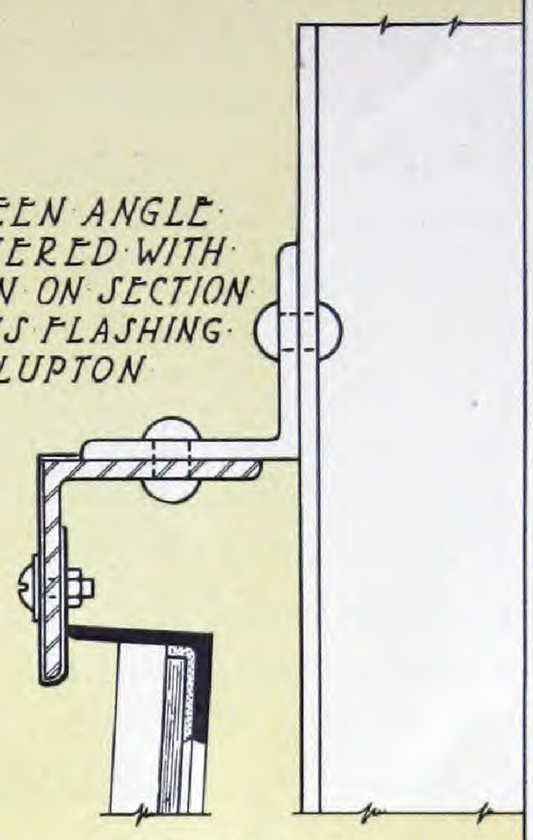
HINGE PUNCHING & GIRT ANGLE FLASHING

NOTE - STRUCTURAL STEEL & FLASHING **NOT** FURNISHED BY LUPTON

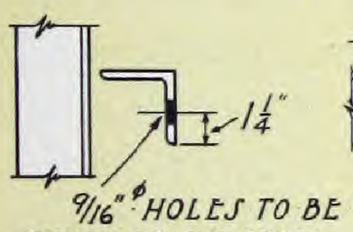


ELEVATION

NOTE - JOINTS BETWEEN ANGLE GIRTS MUST BE COVERED WITH FLASHING AS SHOWN ON SECTION AND ELEVATION THIS FLASHING IS **NOT** FURNISHED BY LUPTON

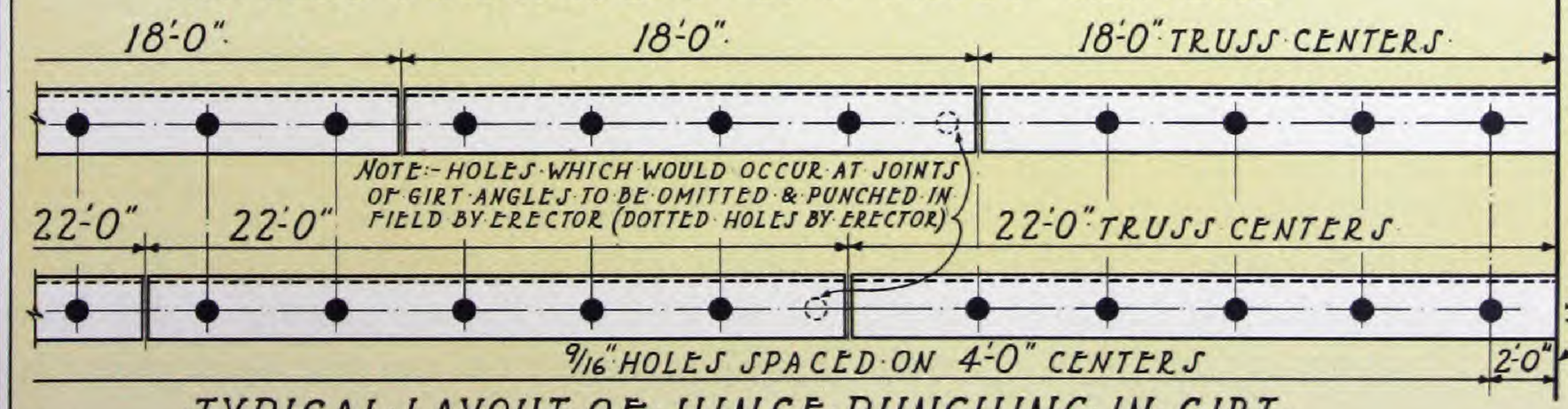


SECTION



TYPICAL LAYOUT OF HINGE PUNCHING IN GIRT ANGLES FOR 16'-0, 20'-0" & 24'-0" TRUSS CENTERS

NOTE:- SASH MUST START ON CENTER LINE OF TRUSS TO MATCH THE PUNCHING SHOWN ON THIS DRAWING.



TYPICAL LAYOUT OF HINGE PUNCHING IN GIRT ANGLES FOR 18'-0" & 22'-0" TRUSS CENTERS

Pond Roof Design

(Patented by Clarke P. Pond)

The Pond Roof Design was evolved to supply needed ventilation and daylight to foundries and all similar buildings in which heat and gases are produced as by-products of manufacturing processes. It corrects the faults of other roof designs, differing from them in that it quickly and thoroughly clears any size building of heat, foul air, or smoke. It provides for large outlets, so placed that they receive ascending air and heat currents with minimum lateral draft. Currents striking the steep planes of the V-shaped portion are swept directly to these outlets. There is no place anywhere for stale air to be pocketed.

Previous to the advent of this roof design, all roofs except the sawtooth type were planned merely to serve as protections from the weather. The primary function of the Pond Roof is to ventilate and light large industrial buildings but at the same time, it includes superior weather-protective qualities. In addition to giving the shadowless lighting and ample ventilation for which it was developed, Pond Truss Roof Design actually gives greater weather protection because it incorporates the use of top-hung continuous sash, which is itself a weather-protecting element. This is fully described on pages 4 to 12.

The remarkable efficiency of the Pond Roof Design, both in ventilation, and in light distribution, has led to its adoption in many manufacturing buildings in various industries, regardless of size. These include automobile assembly plants, rubber works, machine shops of all kinds, glass works, airplane factories, in addition to a great number of foundries, powerhouses, and buildings devoted to the iron, steel and bronze industries. These buildings are remarkable from the standpoint of production under ideal conditions of light and ventilation.

The Ventilation Features

A theory formerly prevailed with regard to foundry ventilation which assumed that any building, even though its air inlets and outlets were small and restricted, would clear itself of foul air, provided only that the building was high enough. The fallacies of this belief are now self-evident. The flat top of the old monitor roof formed a natural pocket for stale air, and the sawtooth roof permitted discharge of bad air only if the direction of the wind was favorable.

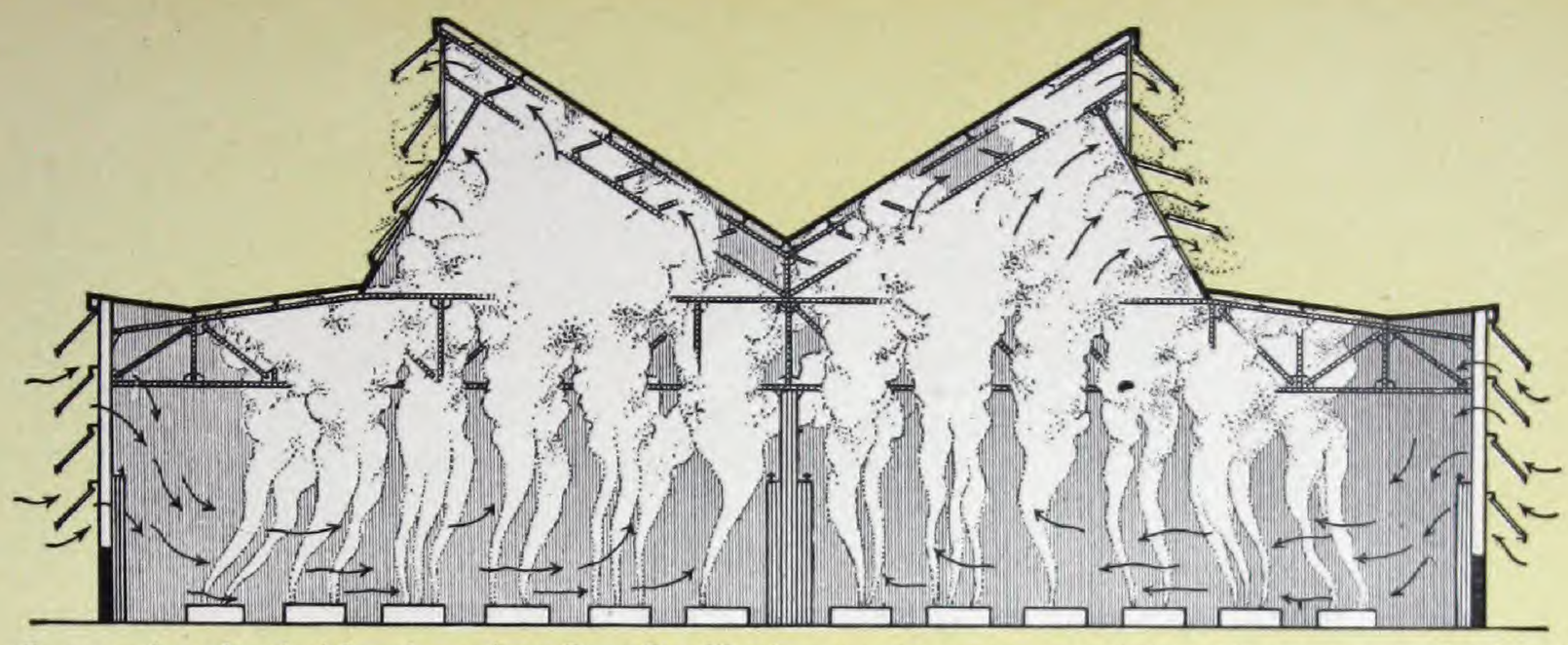
Pond Roof Design gives complete ventilation where the "chimney" theory of foundry ventilation failed. It provides for the proper relation of fresh air inflow to stale air elimination. Buildings of unusual width are as satisfactorily served by it as narrow buildings. This result is obtained through the use of several Pond Trusses with Pond A-Frames located between them. The latter serve for fresh air supply and assist in lighting the whole area. The lower the roof in a heat-producing building, the better, and a Pond Roof need be no higher than is required for crane clearance.

The Lighting Features

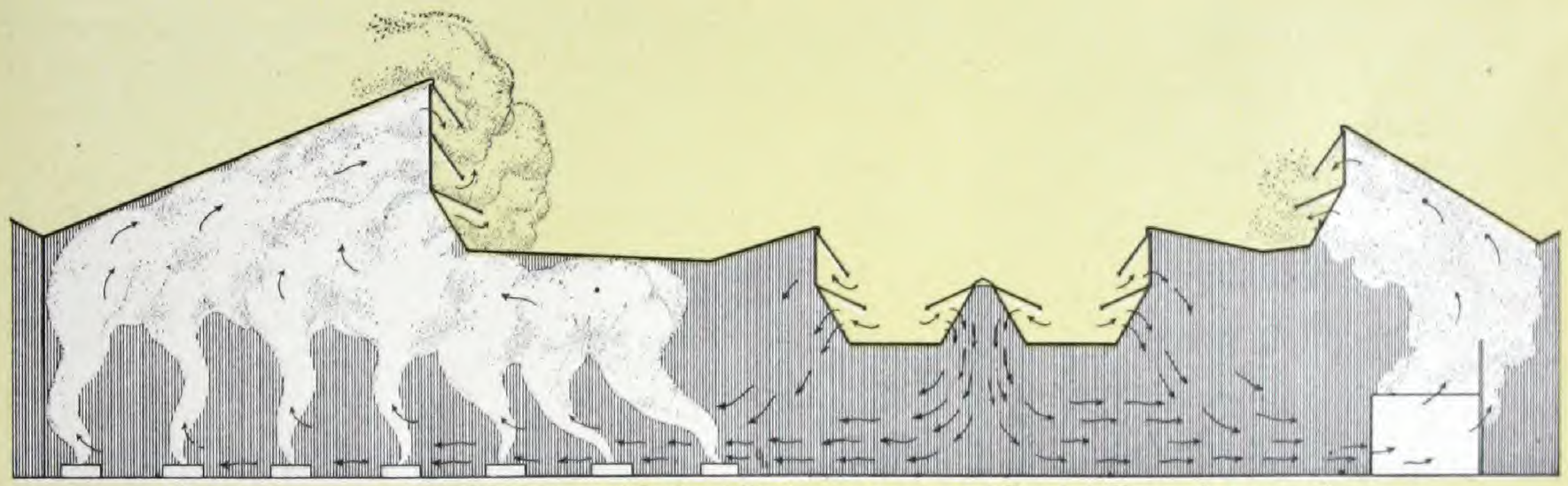
The natural lighting effect of this roof design is easily explainable but is best appreciated when seen. Its superiority in this regard is the result of several carefully planned constructional features.

The location of the continuous sash in the sides of the truss furnishes lighting through a wider angle than in ordinary types of buildings, and also throws a portion of the light against the slopes of the roof, which results in a breaking up of the light rays and a more wide-spread diffusion of the light. The combination of crossing rays, high glass area and

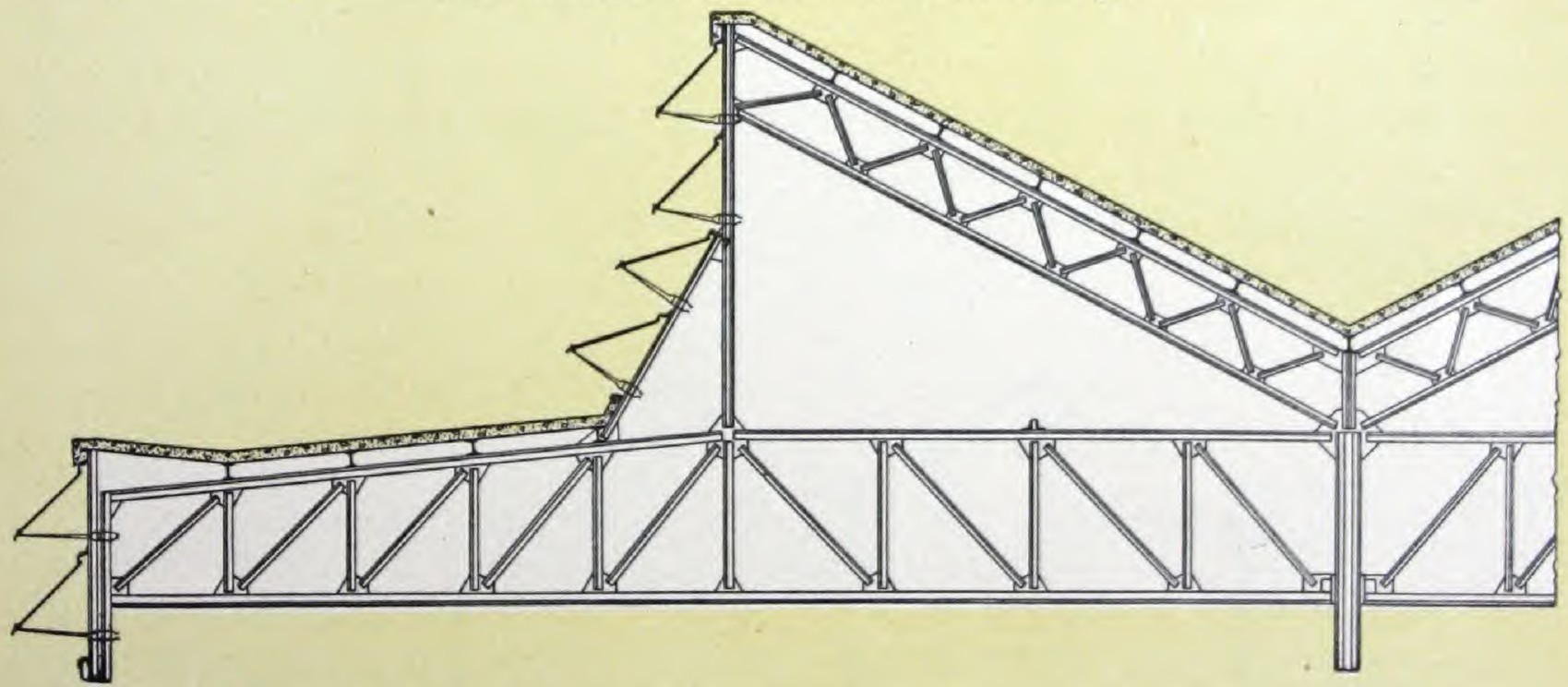
(Continued on page 24)



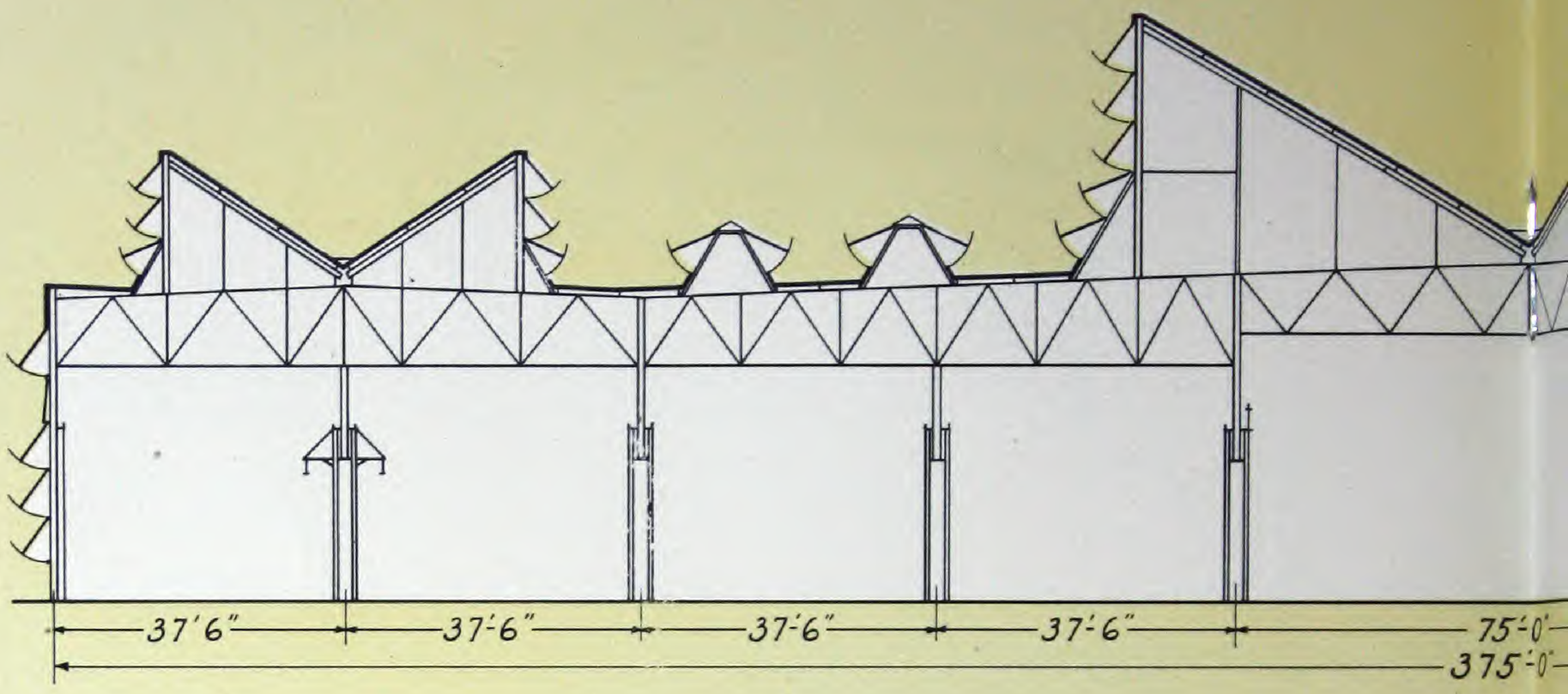
Cross section of typical foundry, using a Pond Roof Design, showing movement of air and heat currents. Smoke will escape against a light cross wind if the lower lines of roof sash are wholly or partly closed.



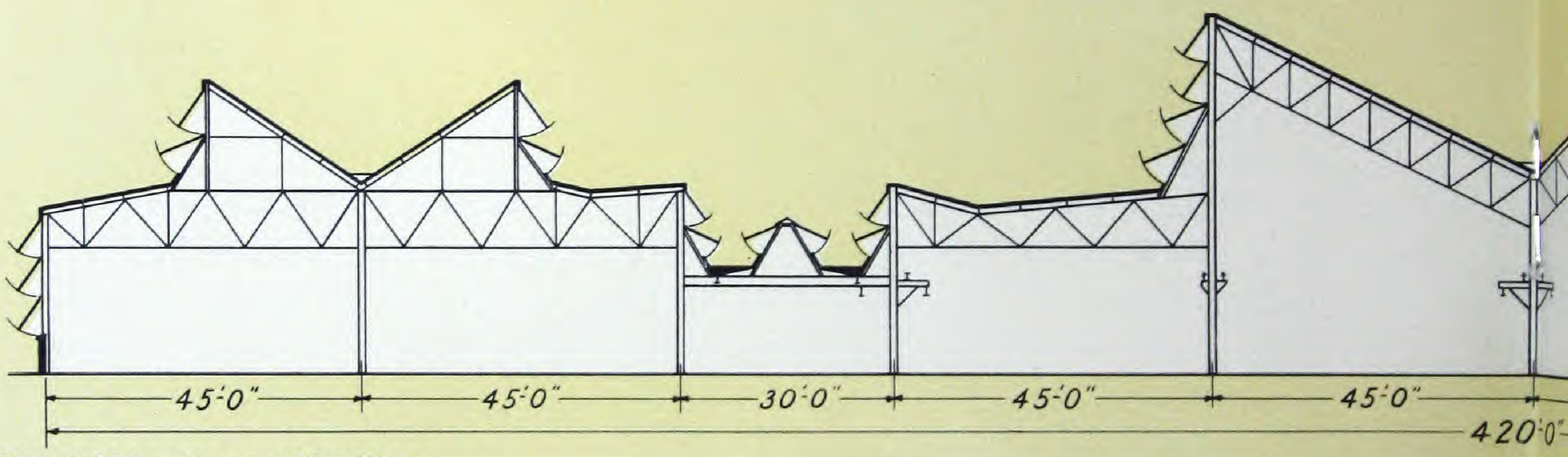
Vertical cross section of foundry, with Pond Designs at ends and Pond A-Frame between them. The latter serves as a fresh air bay in wide buildings.



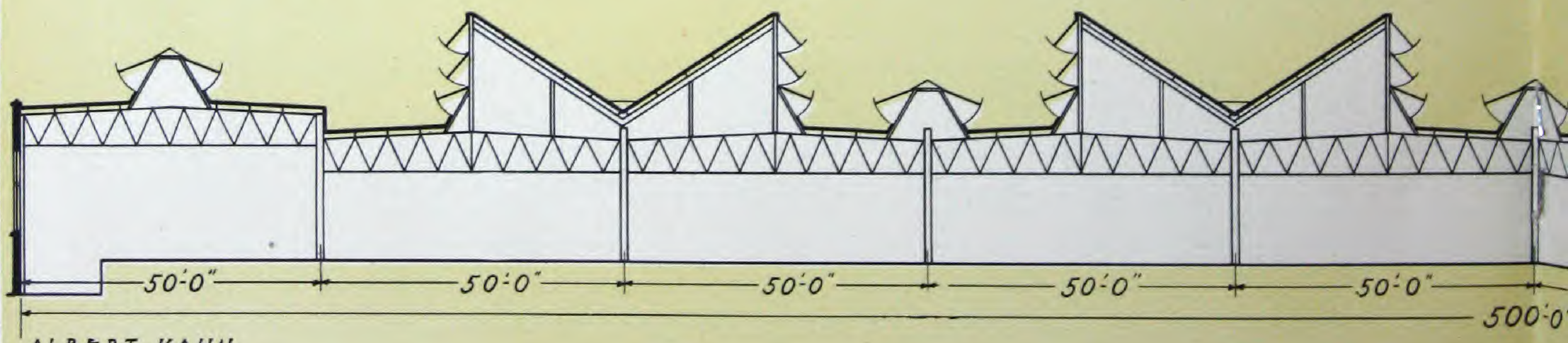
Detail of a typical Pond Roof Design. For the best ventilating results, Pond Continuous Sash should always be used in the lower sidewalls to provide sufficient inflow of fresh air.



C.A. HARDY
ENGINEER

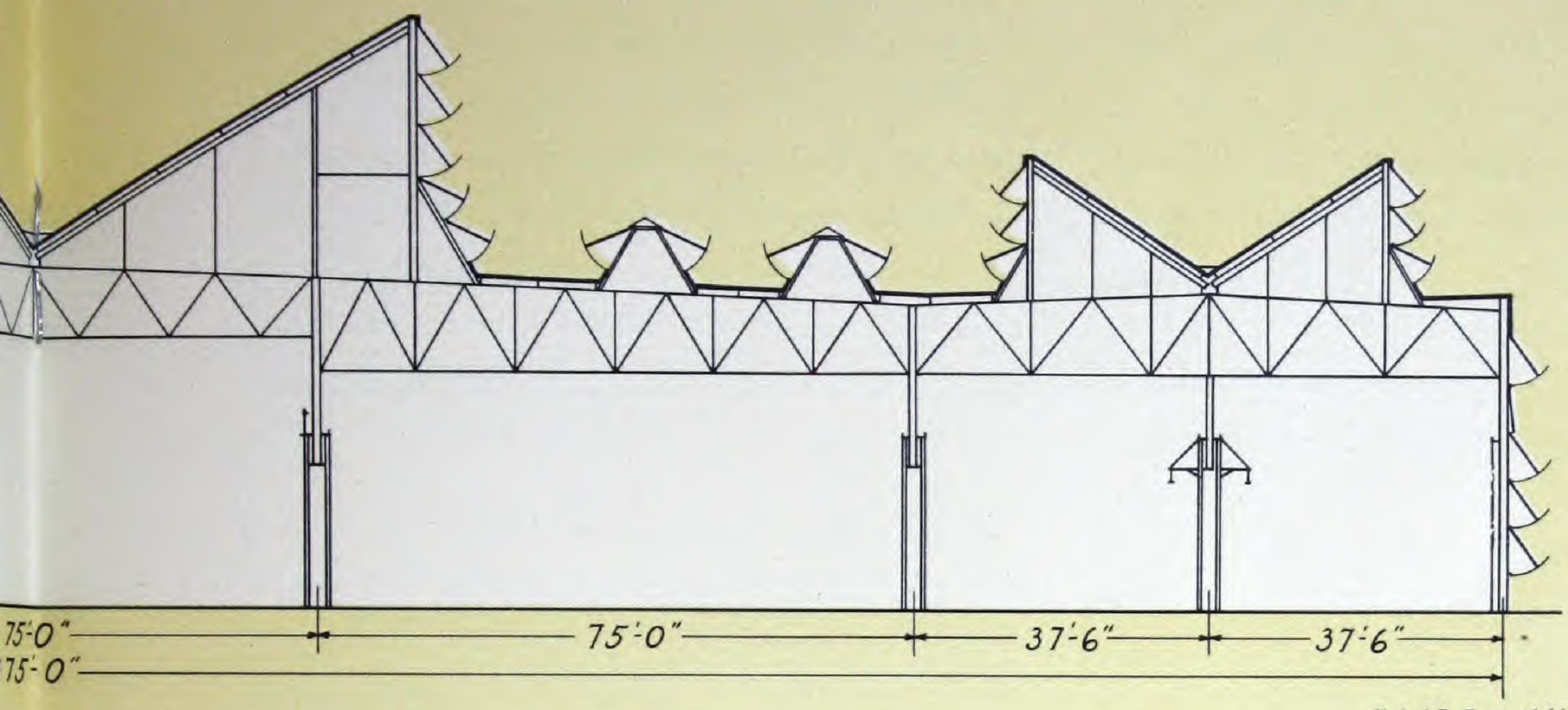


MILLS RHINES BELLMAN & NORDHOFF
ARCHITECTS

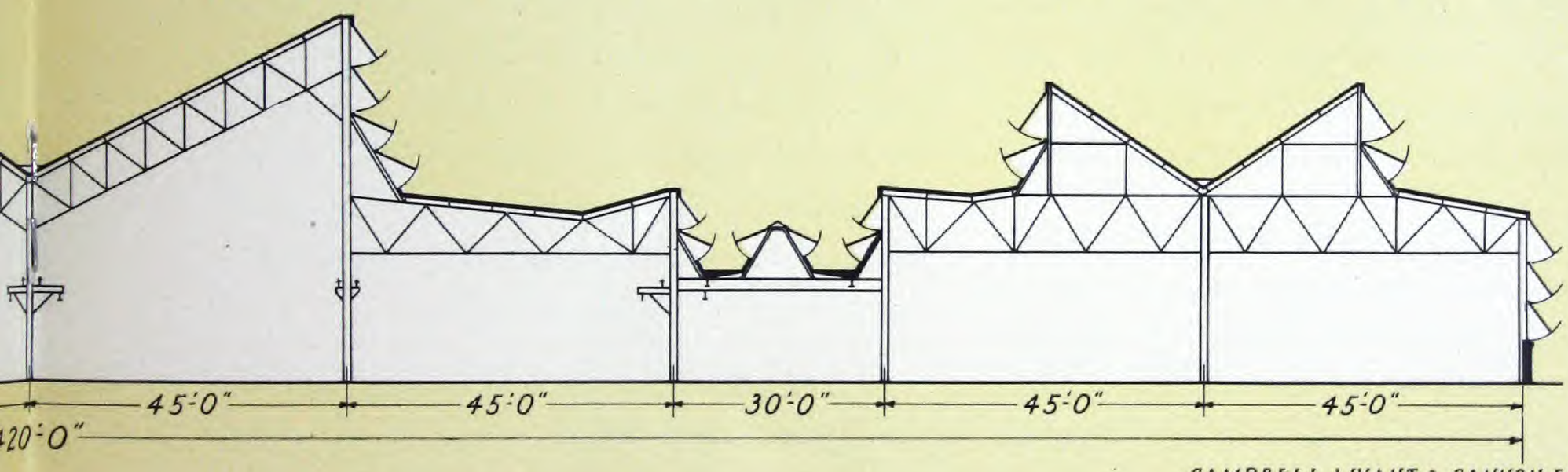


ALBERT KAHN
ARCHITECT

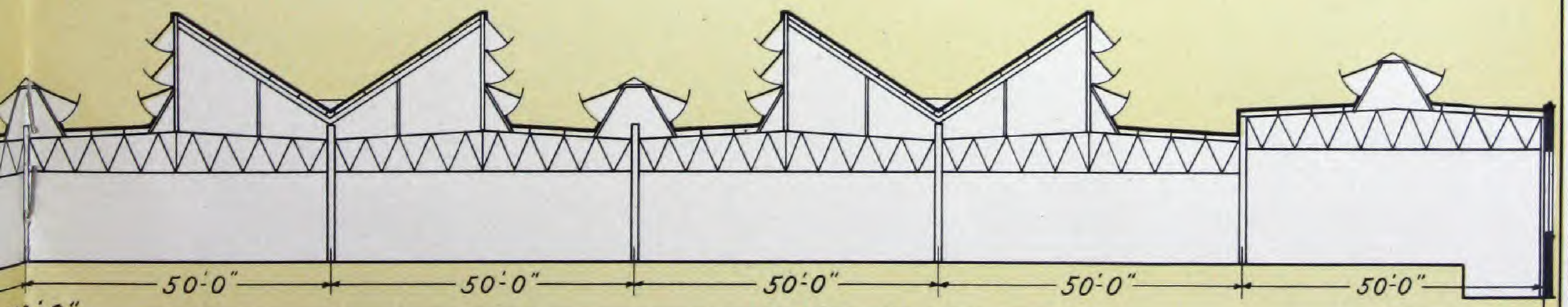
POND ROOF DESIGN



FAIRBANKS MORSE & CO.
BELOIT WIS.



CAMPBELL WYANT & CANNON FOUNDRY CO.
MUSKEGON MICH.



CHICAGO ASSEMBLY PLANT FORD MOTOR CO.
CHICAGO ILL.

reflection from the under roof slopes produces an even lighting not found in other types of buildings.

The Pond Roof Design makes use of the low-intensity morning and evening rays of the sun, no matter in what direction the building may face. Where this type of roof is used, there is no necessity of locating the building with the roof glass to the north, as is the case when a sawtooth is employed. As the lighting is from practically all sides, hard shadows are entirely absent, and workers can see clearly even when facing the sash, because of the light from behind.

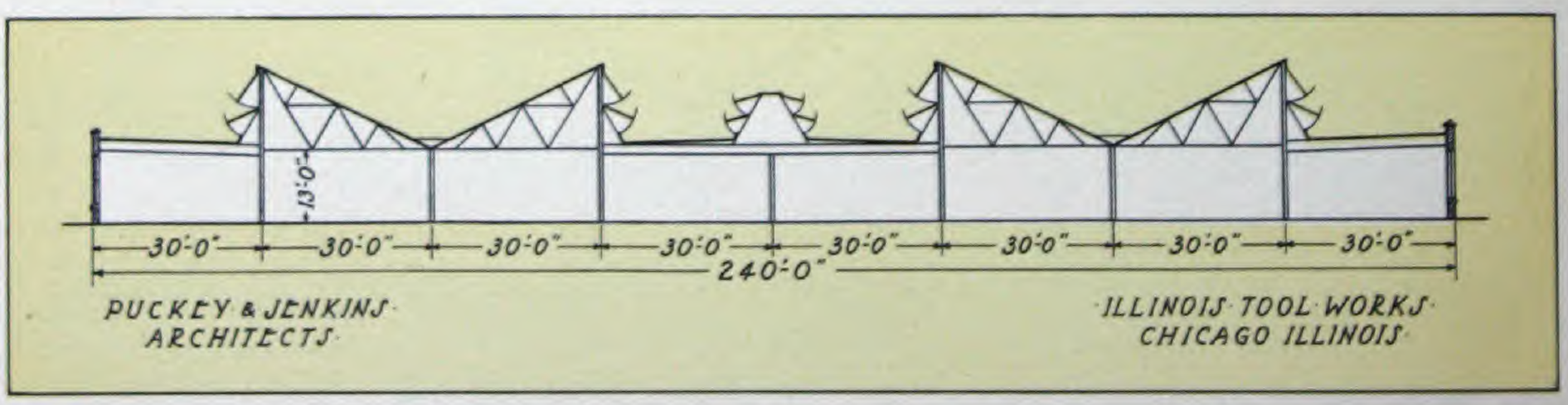
Owing to its better light distribution, a Pond Roof requires less glass area than a sawtooth roof for equally effective lighting, thus saving fuel. Investigation will show that the added cost of steel for a Pond Roof will be more than offset in a few years by this fuel-saving.

Fuel losses can be reduced and the average summer temperature decreased by the use of cork or other suitable insulation between the roof slab and the weather-proof covering. The use of exposed cement tile is to be avoided as tests show excessive heat wastes in winter and unnecessarily high temperatures for the workmen in summer.

Pond Roof Design is not a stock design, but is varied to meet almost any need in high or low buildings. For its correct and most efficient use, the proportions of Pond Trusses and A-Frames should be worked out for each particular case, taking into consideration column spacings, clearance heights, crane requirements, heat produced and the intended use of the buildings.

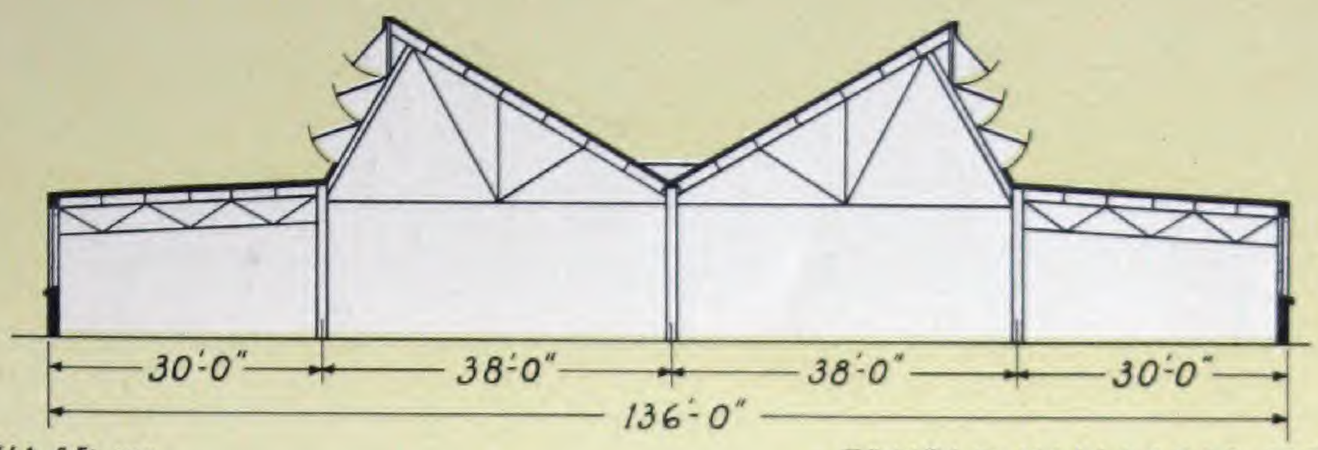
Regardless of width, any building can be naturally lighted and ventilated by the use of Pond Trusses and Pond A-Frames. No longer must a building be designed that cannot exceed a certain size because of the limitations of lighting and ventilating the center bays. The line cross sections shown below and on pages 22, 23, 25 and 26, are typical of successful installations of this modern roof design. Equally satisfactory results, also, are being obtained in small buildings where good lighting and ventilation are essential.

Our recommendations will be freely given; there is no obligation in asking us to study your requirements.



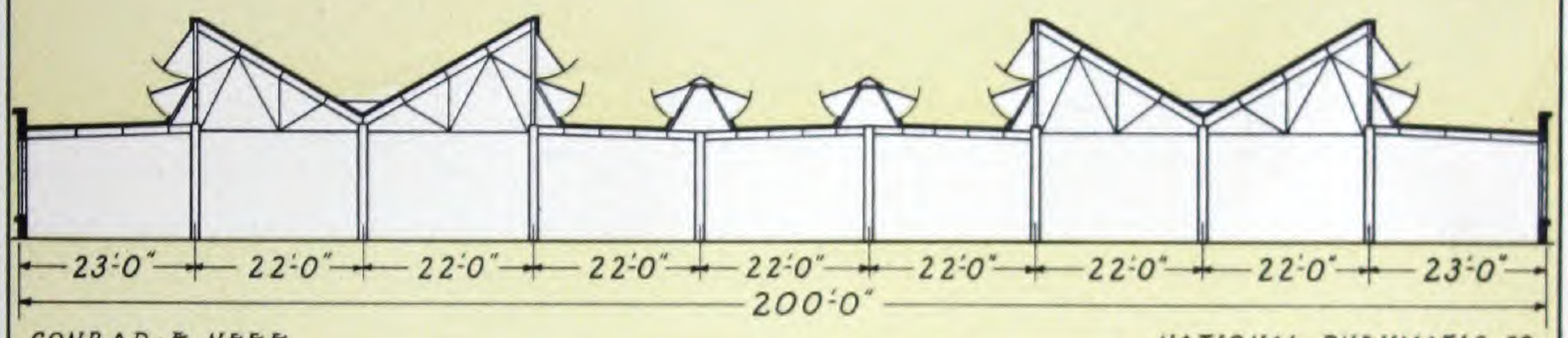
Sketches of buildings shown here and on pages 22, 23, 25 and 26, are representative of the types of buildings in which the Pond Roof Design is used. They cover many different industries, in large and small buildings.

POND ROOF DESIGN



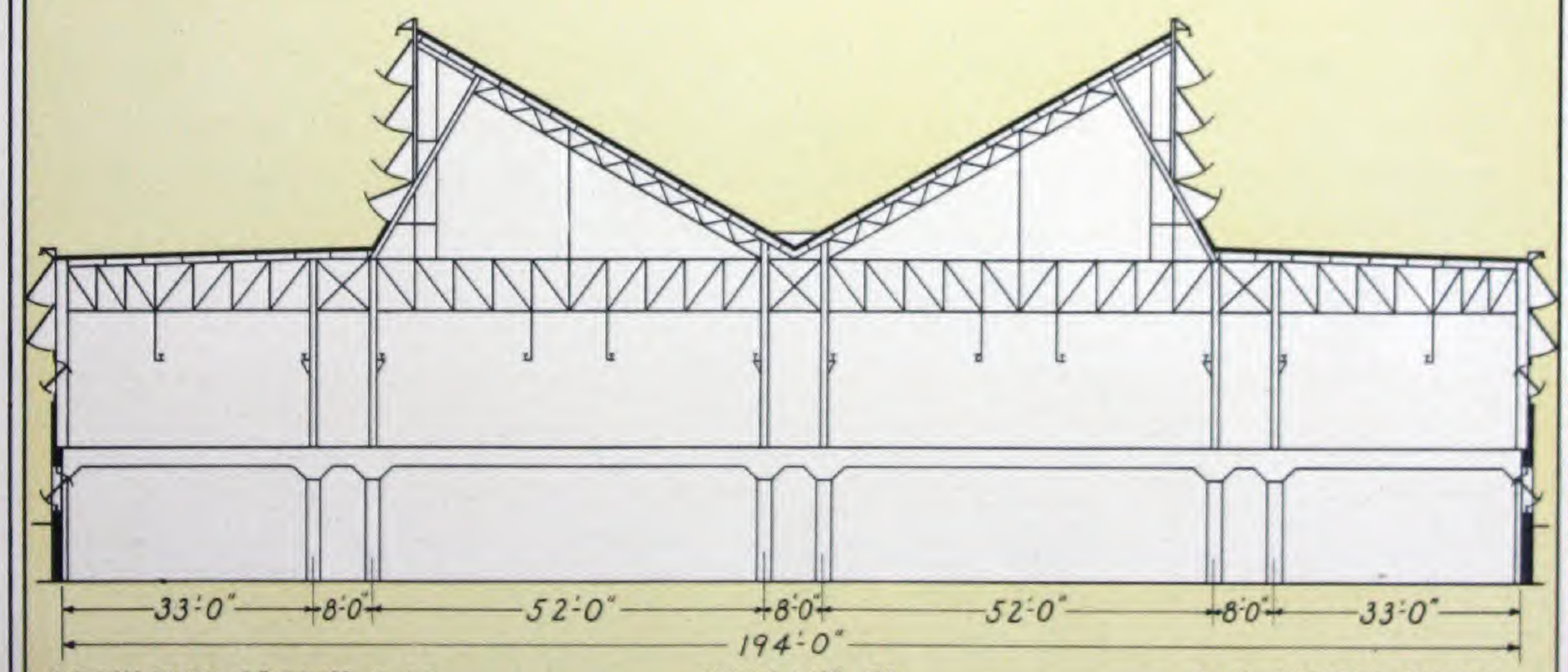
FRANK D CHASE INC.
INDUSTRIAL ENGINEERS

TEMPLE MALLEABLE IRON & STEEL CO.
TEMPLE PA.



CONRAD P. NEFF
ARCHITECT

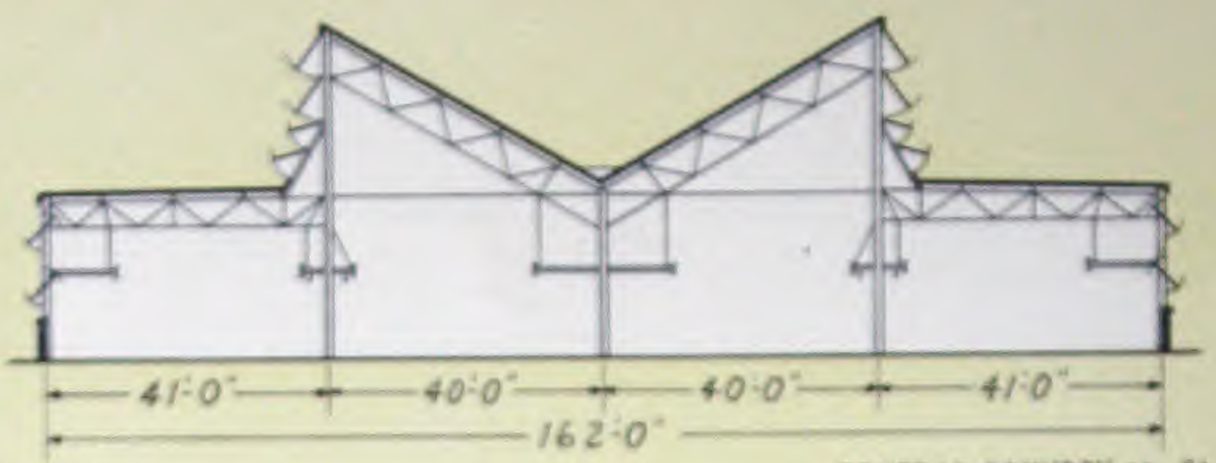
NATIONAL PNEUMATIC CO.
RAHWAY N.J.



LOCKWOOD GREENE & CO.
ENGINEERS

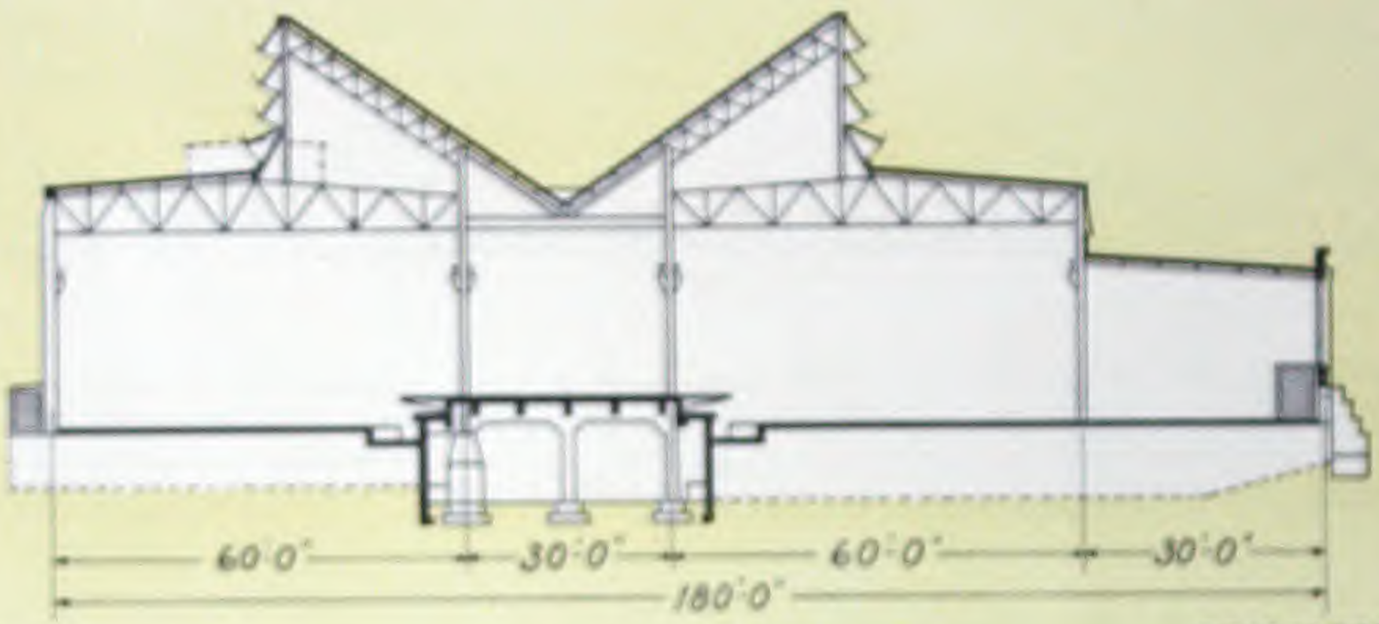
H.M. LANE CO.
CONSULTING ENGINEERS

SACO-LOWELL SHOPS
NEWTON UPPER FALLS MASS.



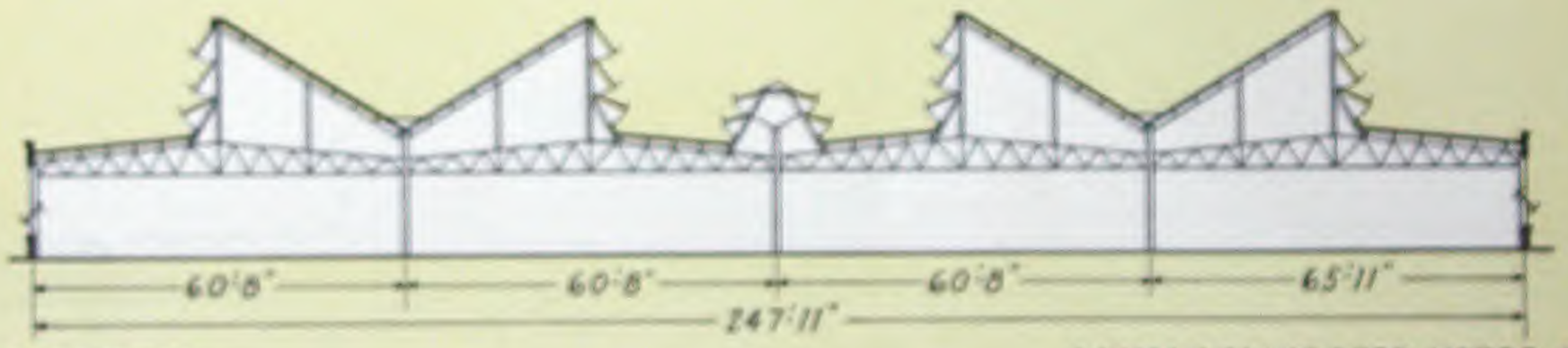
FRANK D CHASE INC
INDUSTRIAL ENGINEERS

CENTRAL FOUNDRY OF SAGINAW PRODUCTS CO
SAGINAW MICH



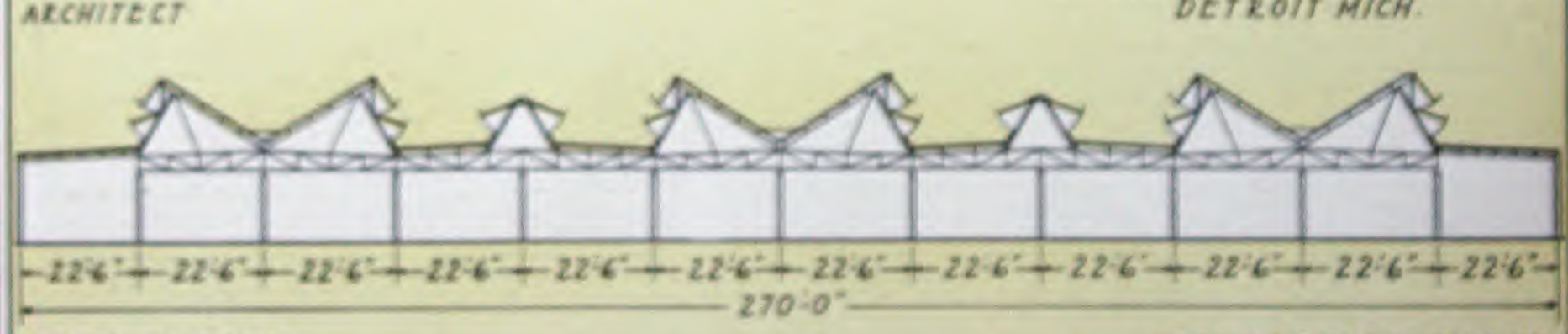
H.M. LANE CO.
CONSULTING ENGINEERS

BRIDGEPORT BRASS CO.
BRIDGEPORT CONN.



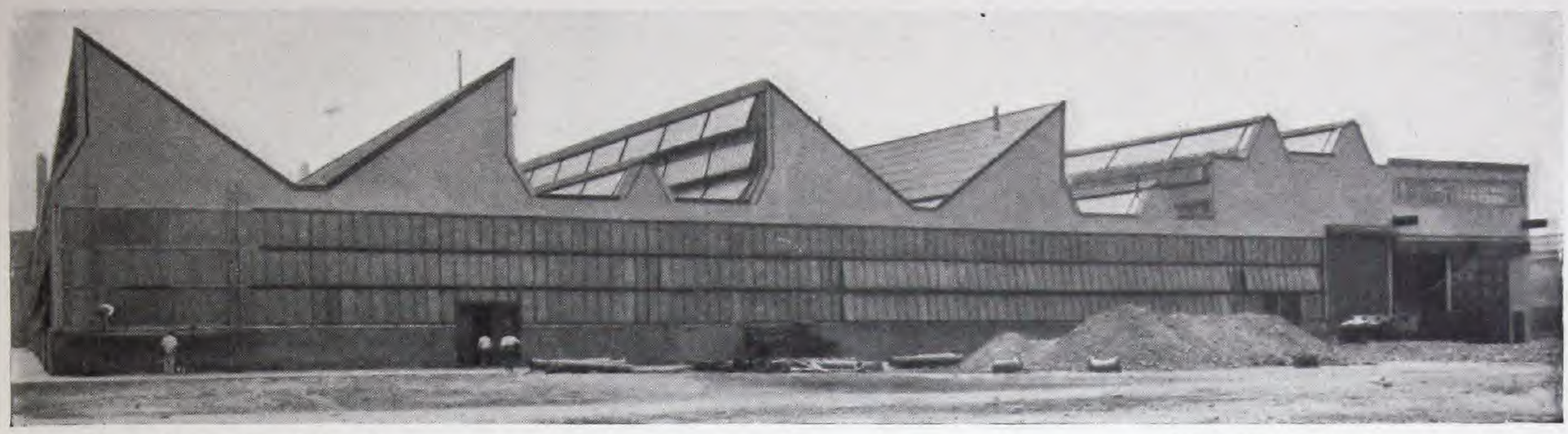
ALBERT KAHN
ARCHITECT

LINCOLN PLANT FORD MOTOR CO.
DETROIT MICH.



RUSS & KARGES
ENGINEERS

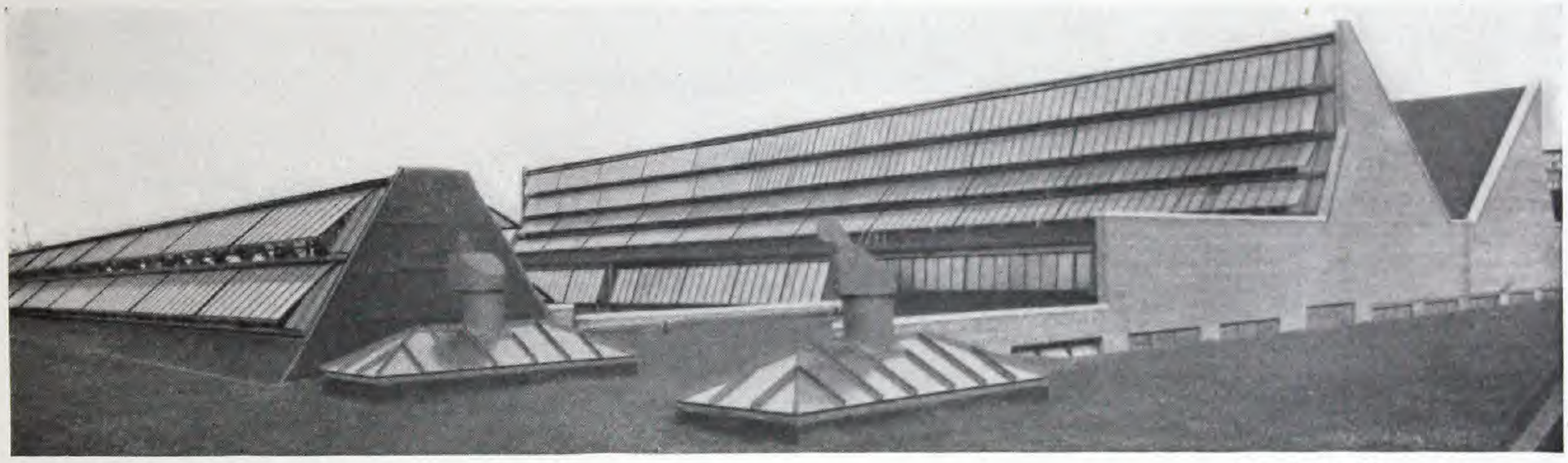
HERCULES GAS ENGINE CO.
EVANSVILLE IND.



Ford Motor Co., Glass Plant
River Rouge, Mich.

Albert Kahn, Architect
Everett Winters Co., Contractors

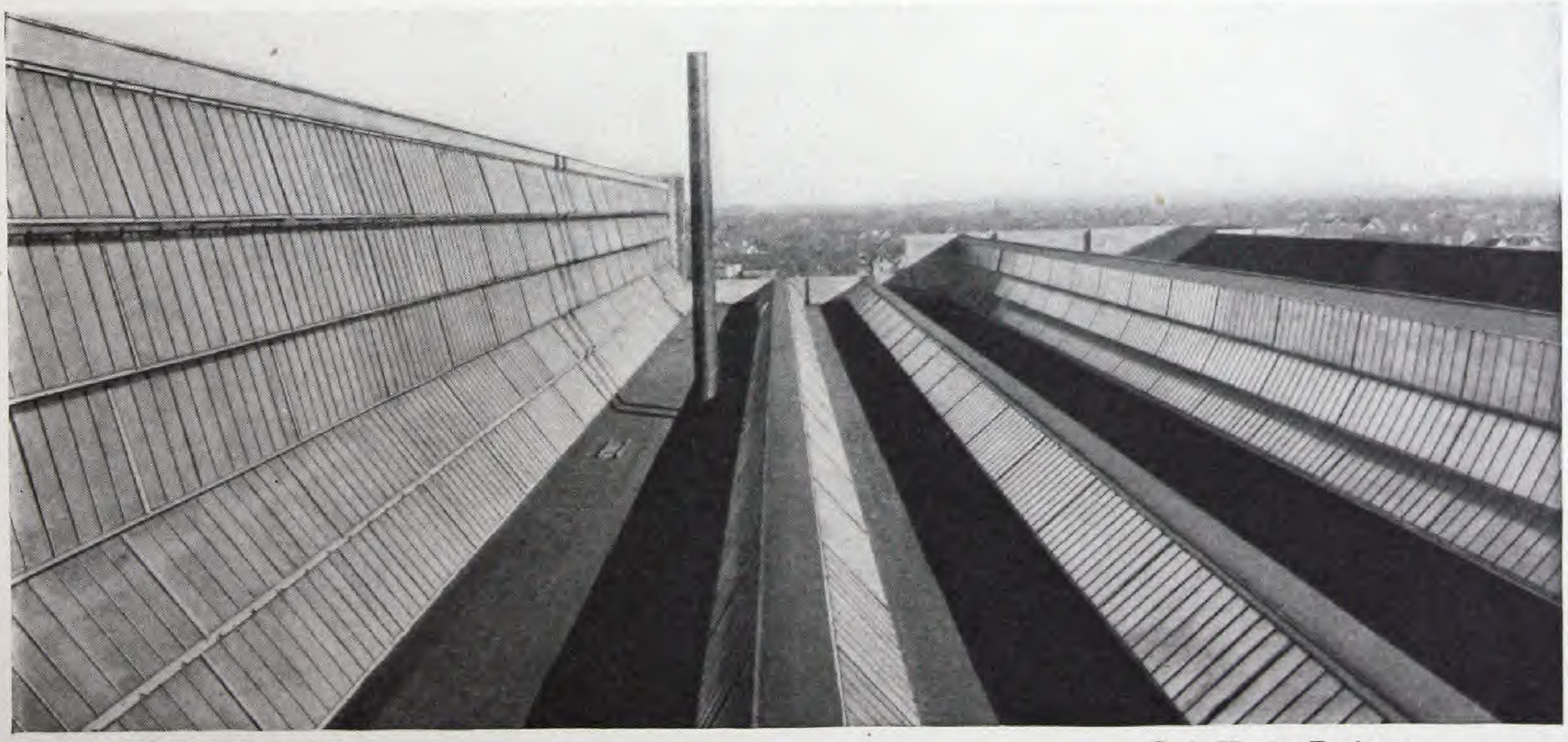
Two Pond Roof Designs are used at the left, with a Pond A-Frame between them. These are located over the grinding and polishing departments. The two A-Frames at the right are over the material bay. This building is 280 feet wide.



The Lunkenheimer Company
Cincinnati, Ohio

Frank D. Chase, Inc.
Industrial Engineers

A roof view showing the relation of Pond Roof Design to Pond A-Frame. In this installation, each run of sash, 220 ft., is operated by a single Pond Operating Device with hand chain control.



Fairbanks, Morse & Co.
Beloit, Wis.

C. A. Hardy, Engineer
Leonard Construction Co., Contrs.

Looking east from roof of material building showing Pond A-Frames between the large Pond Roof Design and a smaller one. All sash is controlled by Pond Operating Device, motor driven.

Chicago Riding Club
Chicago, Ill.

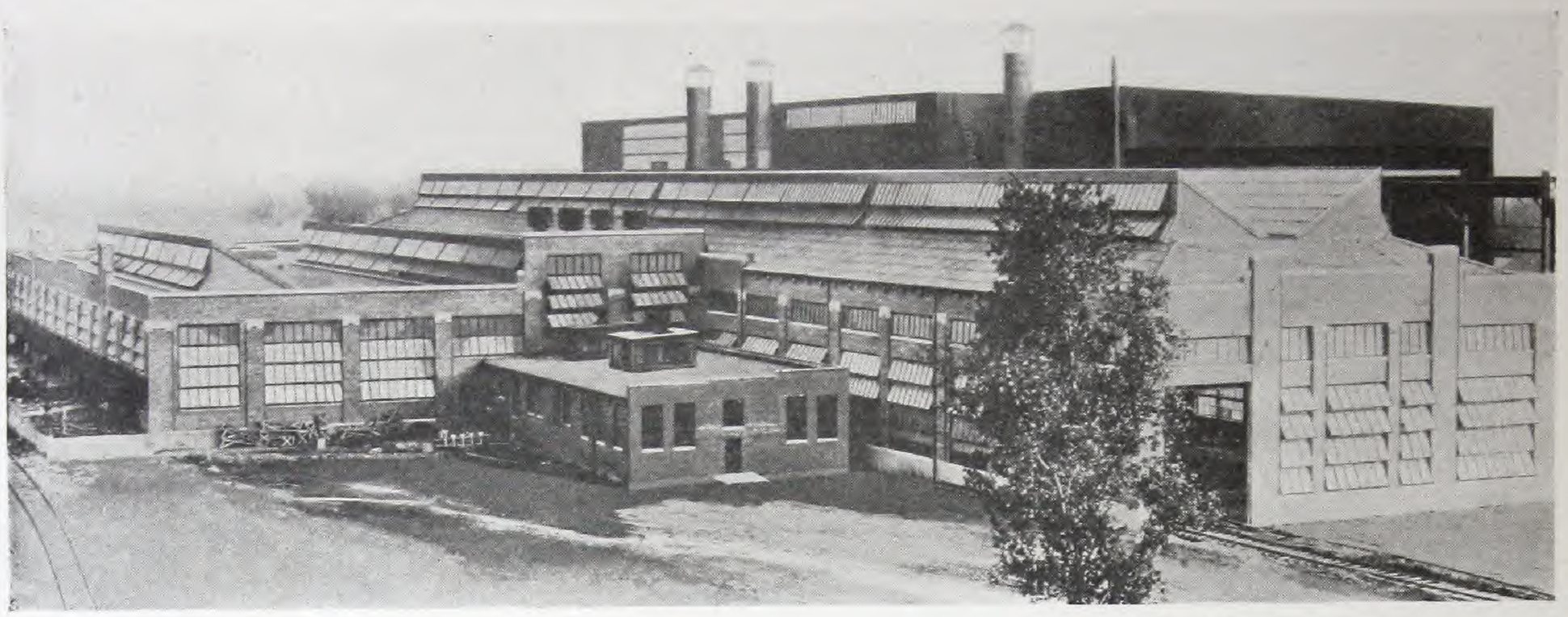
Rebori, Wentworth & Dewey, Inc., Archts.
Bulley & Andrews, Contractors

An unusual building, the inside of which is as light as the outdoors. Long lines of Pond Continuous Sash in the sides of the Pond Roof Design provide remarkable light, shown in the view below. This sash need not be closed during a storm, insuring maximum ventilation during the warm months.

Ford Motor Company, Assembly Plant
Chicago, Ill.

Albert Kahn, Architect
Avery Brundage, Contractor

This building is 500 ft. wide by 1360 ft. long. Four Pond Roof Designs are used to provide the necessary light and ventilation in so large a building. Pond A-Frames are used between the Roof Designs, serving as fresh air inlets. View below shows the roof, with Pond Continuous Sash in all roof openings.



Mount Vernon Car Mfg. Co.
Mt. Vernon, Ill.

John J. Davey, Architect
Neiler, Rich & Co., Engrs.
Hughes-Foulkrod Co., Contractors

Pond Continuous Sash is used throughout this manufacturing building. Pond Roof Design serves over the large center building for natural ventilation and maximum daylighting. Short runs are used between pilasters in the lower sidewalls. All sash is controlled by Pond Operating Device.

Chicago Motor Coach Co.
West Side Garage
Chicago, Ill.

Martin C. Schwab, Consulting Engineer
Bulley & Andrews, Contractors

Remarkable lighting results and freedom from gasoline fumes are obtained by the Chicago Coach Co. in the garage. The two way lighting of a Pond Roof Design overcomes the inherent limitations of the monitor or sawtooth roof.

POND CONTINUOUS SASH

Illinois Tool Works
Chicago, Ill.

Puckey and Jenkins, Architects
Frank H. Stowell Co., Contractors

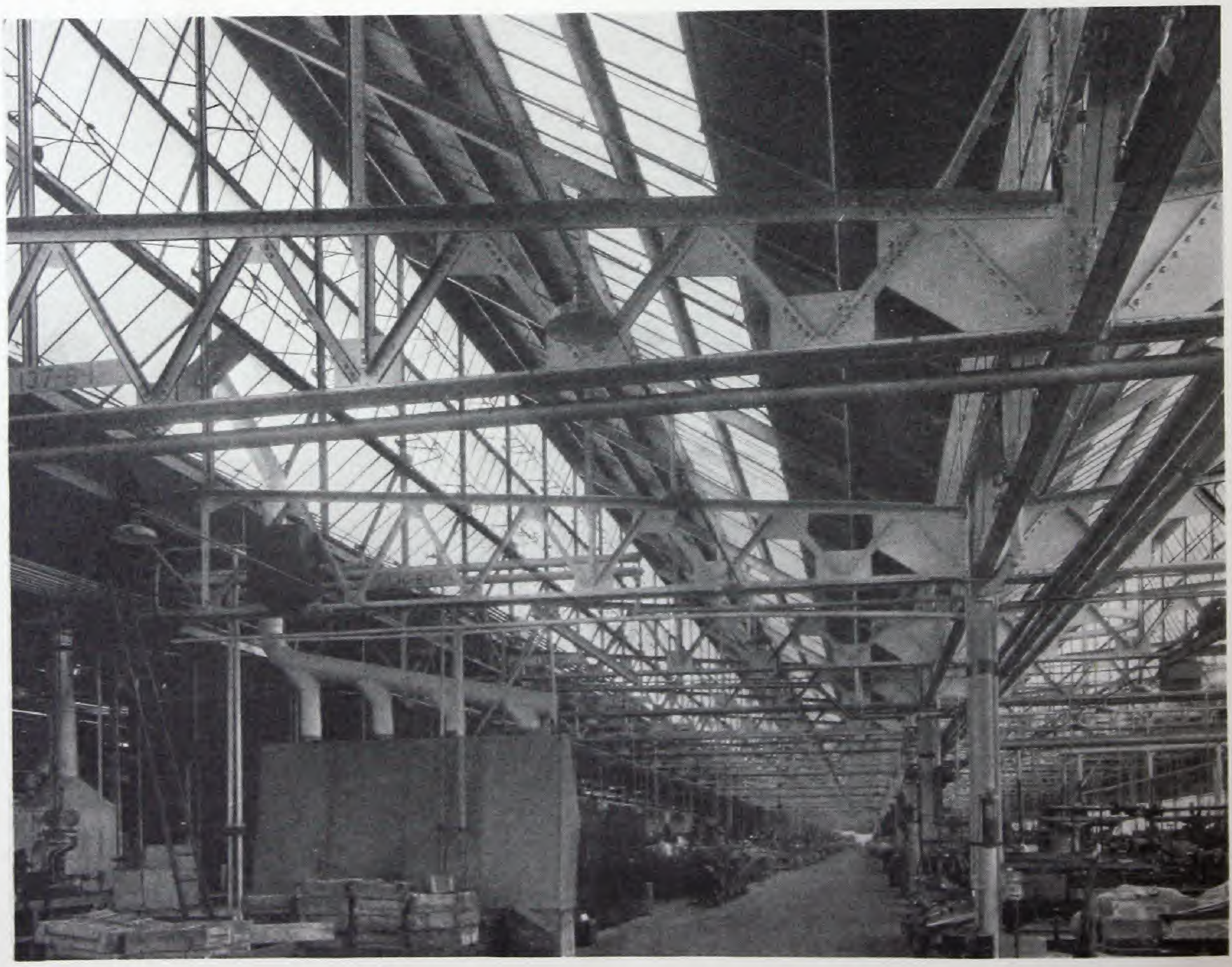
A pleasing installation of Pond Continuous Sash in a manufacturing building of moderate size. Two Pond Roof Designs are used with an A-Frame between them. Lupton Pivoted Sash were specified for the lower sidewalls. View below shows the unusually good lighting so necessary in a plant of this type.

A Pond Roof Design permits freedom in plant layout because of its uniform lighting features.

Ford Motor Company
Lincoln Division
Detroit, Mich.

Albert Kahn, Architect
Walbridge, Aldinger Co., Contrs.

Two large Pond Roof Designs, with an A-Frame between them, all hung with Pond Continuous Sash. Each line of sash is 842 ft. long and is controlled by a single Pond Operating Device, Motor Driven. An interior view is shown below, corrugated wire glass being used in the valley of the Roof Design for additional lighting. In addition to the Ford Motor Co. installations shown in these pages, Lupton has equipped Ford Plants in Jacksonville, Fla., Norfolk, Va., Dallas, Texas, Los Angeles, Cal., and Louisville, Ky.



POND OPERATING DEVICE

(Patented and Patents Pending by Clarke P. Pond)

Pond Operating Device is designed on the tension principle of transmission to operate long lines of top-hung Pond Continuous Sash. Its wide-spread application for the past sixteen years, both in side walls and roofs, is tangible proof of its worth.

The first test of an operator is the square feet of opening it produces for a given effort in a given time. The second is its ability to repeat this performance indefinitely, with only nominal maintenance. Pond Operating Device meets both of these conditions better than other devices. This is due to its design, which eliminates useless stresses and destructive friction, and the correct proportioning of its every detail, which ensures freedom from breakdown in service.

Through the use of the tension principle of transmission, this device avoids trouble resulting from loss of alignment due to bending or other causes. It gives a flexible, nearly frictionless application of power, free from lateral stresses and involving no difficulties in support and erection.

Pond Continuous Sash can be operated by Pond Operating Device in continuous runs to 1,000 feet long or of paired upper and lower runs up to 500 feet long. With sash thus controlled, ventilation becomes systematic, and is not left to the individual whims of workers, nor is local ventilation determined by each worker.

For installations of Lupton Pivoted Sash beyond the limits of Lupton Operating Device, Pond Operating Device should always be specified for satisfactory results.

This device can be furnished with hand chain control or with motors. We shall be glad to co-operate with prospective users and make recommendations for the best method of obtaining desired results.

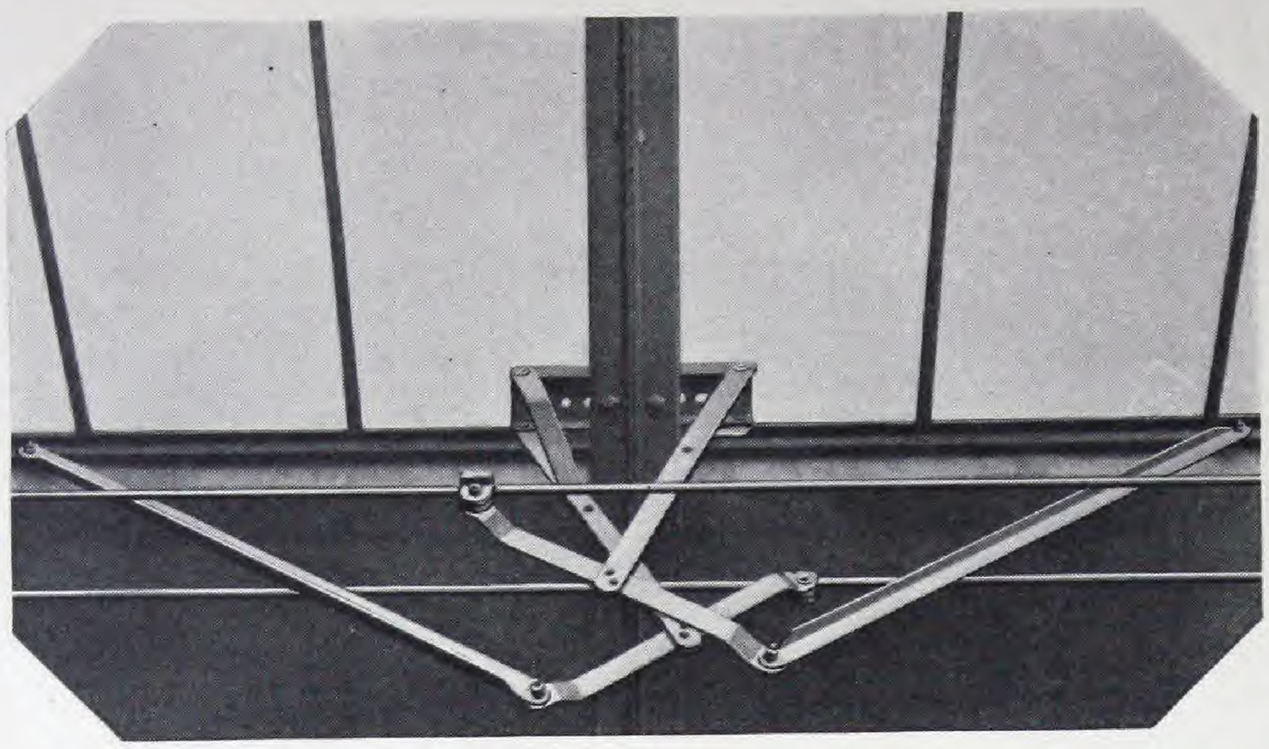
Mechanism

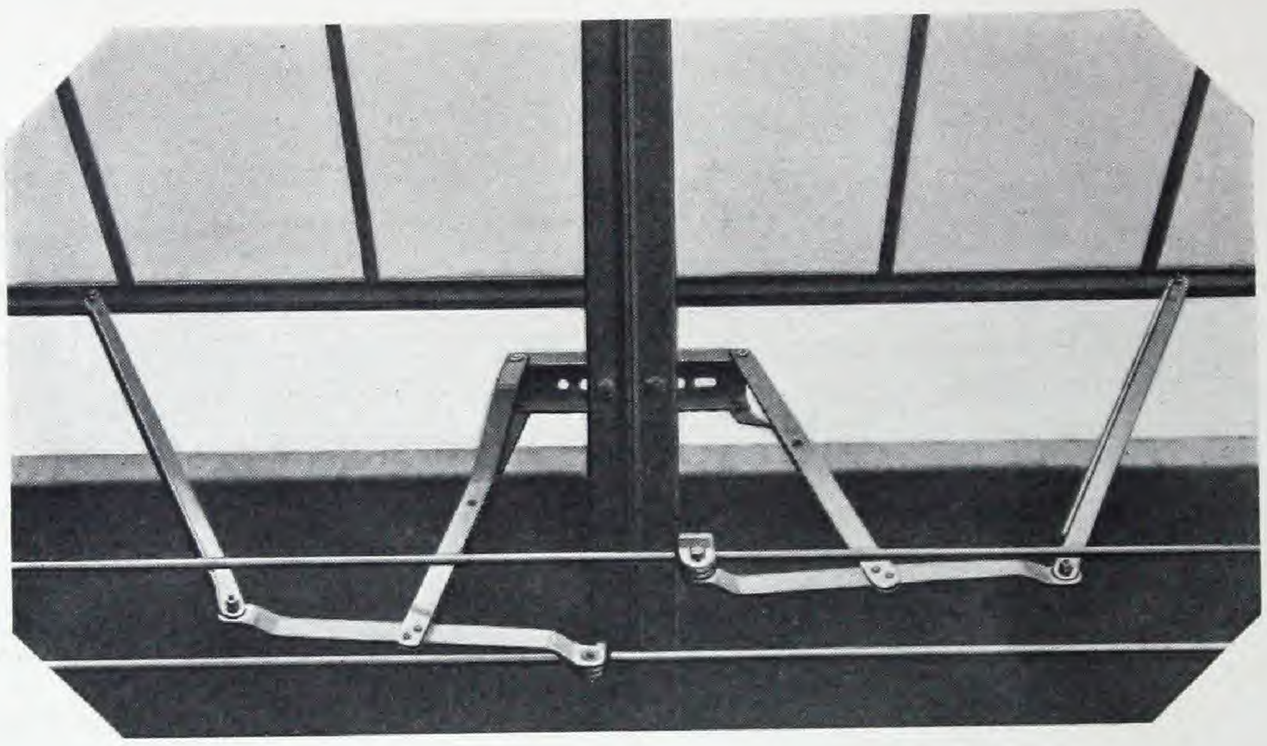
The transmitting mechanism consists of two tension rods, connected at the operating end by a sprocket chain and at the other end by a link chain, passing over an idler pulley. Compound levers, having their fulcrums at stationary brackets and their other ends connected to the sash rods, and moving in opposite directions, are attached to the tension rods. These levers exert an angular thrust, and their leverage becomes more favorable as the sash opens and the load becomes heavier. Since they work alternately right and left, the angular components neutralize each other. The sash rods act on the levers, not on the transmission rods, and, therefore, exert no "back thrust" against the latter.

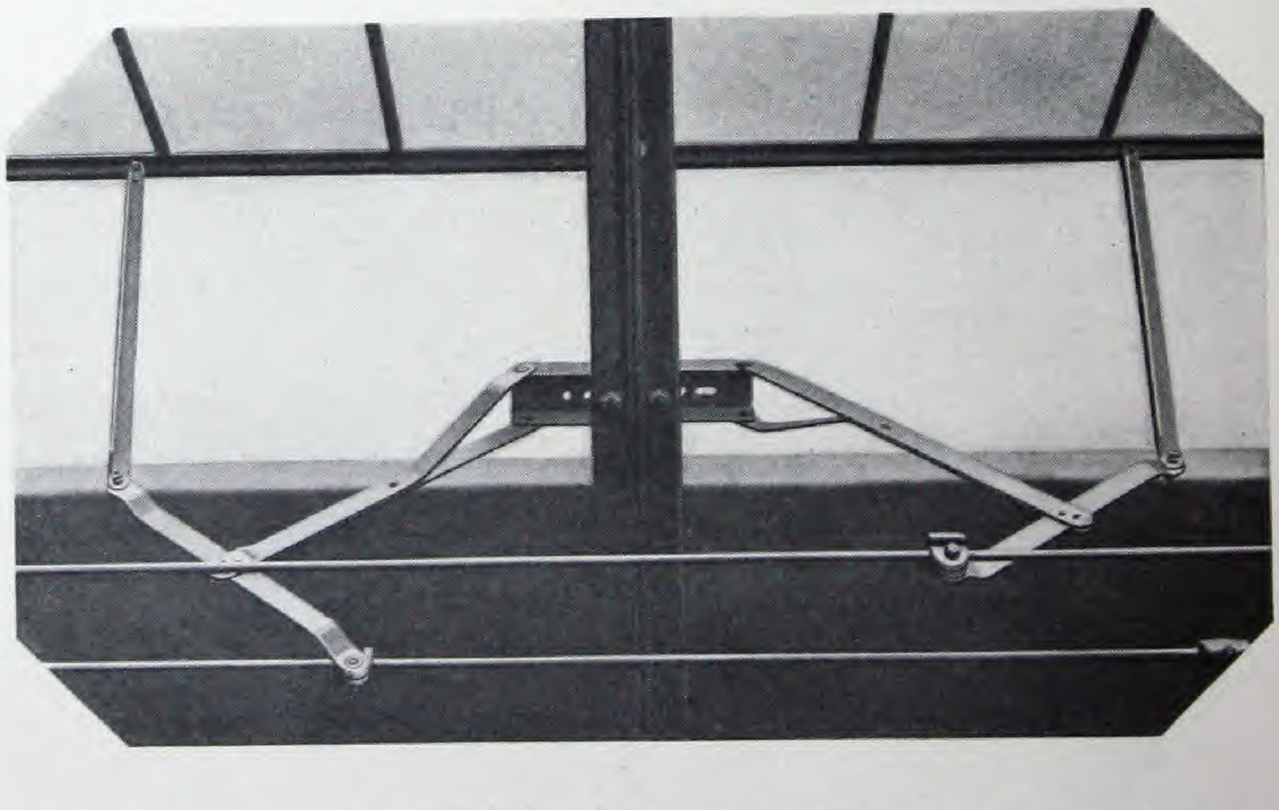
As the transmission rods are subject only to tension, they are very light and flexible. Instead of working in guides, they are supported by the compound levers, on which they float with negligible friction.

The operating power on the hand-operated device contains a steel cut worm gear enclosed in a dustproof, grease packed case. The worm holds the sash at any angle, preventing slamming and breakage of glass. The worm shaft runs in ball bearings, and all plain bearings in the transmission line are phosphor bronze. Friction is thus minimized.

Rods are steel, in 20 foot lengths, with ends hot headed and connected by couplings. Two stops are attached to the sprocket chain, by which undue strain on the transmission and sash is prevented. Bearings in the idler pulley and compound levers are phosphor bronze.







Views above show various positions of sash operating arms of Pond Operating Device when sash is open, closed, and partly open. The top view shows sash in a closed position. In the center view the sash is partly open and at the bottom, it is fully open.

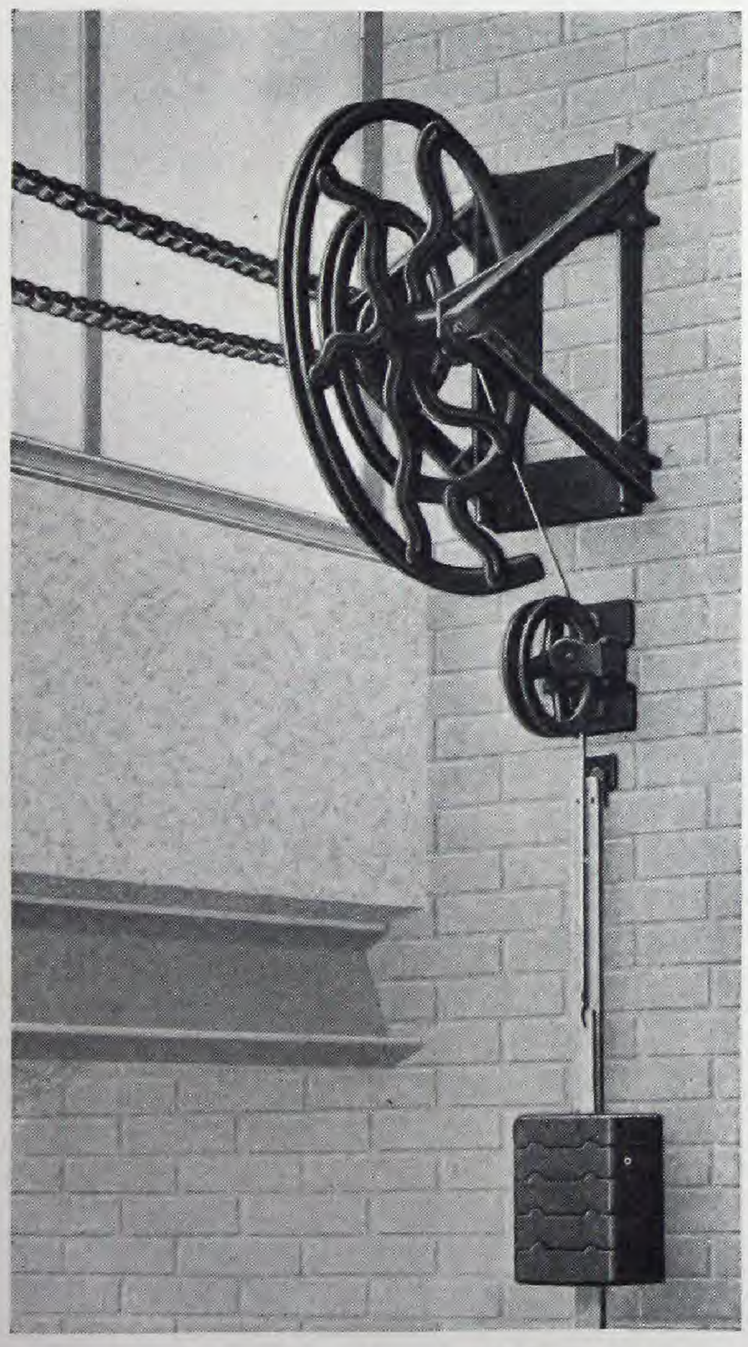
Width of Opening

Pond Operating Device gives a wide opening quickly, and absorbs little power in friction when operating long lines of steel sash. The table below gives guaranteed openings of Pond Continuous Sash by Pond Operating Device:

3′ high top-hung continuous sash 46° or 28″
4′ high top-hung continuous sash 47° or 38″
5′ high top-hung continuous sash 42° or 43″
6′ high top-hung continuous sash 36° or 44″

Spirals and Counterweights

The idler pulley described on page 33 is intended for use with hand-operated runs of from 150 to 300 feet in vertical openings, depending on the height of the sash (150 ft. for 6 ft. sash, 300 ft. for 3 ft. sash). Such runs, on the standard slope of 30 degrees, may be from 100 to 200 ft. long.



Spiral and Counterweights as they look in use, applied to a line of Pond Continuous Sash.

The length of these runs can be doubled by using Spirals and Counterweights. Thus the number of operating powers is reduced one-half, an important item in a large plant because of the time saved in opening or closing the sash.

For these long runs, the Spiral is used in place of the idler and the Counterweight is hung on a steel cable which winds on the Spiral. Thus a tension is applied to the transmission rods which balances, approximately, one-half the sash load. A guide is included with the Spiral and Counterweight.

Motor-operated runs of Continuous Sash can also use Spirals and Counterweights. They make the motor load and speed substantially uniform, and prevent excessive overload on starting the motor with the sash partly open. For very long motor-operated runs, they should always be used.

Spirals and Counterweights must be specified in bid and order if desired. They should be considered for use in any condition where additional powers might be necessary. Spirals and Counterweights are an exclusive feature of Pond Operating Device.

Parts Not Furnished by Lupton

All structural supports for Pond Operating Device are furnished by the structural contractor. This includes supports for the power, and for the compound levers attached to the transmission rods. We furnish detail blueprints as needed.

Specifications

All Operating Device (except as otherwise noted on plans and drawings) shall be Pond Operating Device, made by David Lupton's Sons Company, Philadelphia.

Construction

The operating power shall consist of a machine-cut steel worm shaft, mounted in ball bearings, and a machine-cut worm gear made from solid steel with integral sprocket wheel. Power shall be enclosed in a dustproof case packed with grease. It shall be constructed so that the gear locks the sash in any position. These powers are to be located at ends of runs and controlled each by a continuous hand chain reaching to within 12 inches of the floor.

The transmission line shall consist of solid, flexible rods, not over ½ inch in diameter, for hand operated runs. For motor operated runs, the rods may be ¾ inch diameter. Transmission rods shall have hot-headed ends to give maximum tensile strength. Turnbuckles, of forged steel, to adjust transmission line shall be furnished.

Heavy steel chains shall be used to carry transmission line over sprocket wheel in the power and over the idler at opposite end of the run, but otherwise it shall not be guided or run through rollers or other bearings.

All back thrust from sash shall act directly against the operating arms and not against the transmission line. All bearings on operating arms are to be phosphor bronze; operating arms to be of the rigid type without pivots.

Painting

All Operating Device shall have one coat of manufacturers' standard paint applied before shipment.

Erection

All Operating Device shall be erected and adjusted to proper working order by the Sash Contractor.

Pond Operating Device
Motor Driven

Pond Operating Device, Motor Driven, ventilates the large industrial plant with the same precision and completeness as it does the small plant, by co-ordinated, uniform control.

The ideal ventilating result is obtained by operating all the sash by motors, with switches so located that both inlets and outlets may be regulated by the same person, preferably the foreman or shop superintendent. To control the air change or to open or close the sash for any reason then requires only the pushing of a button.

Thus it is possible to combine the efficient organization of the great industrial plant with even more than the small-shop facility in ventilation control. If certain bays require separate control, their switchboards can be located accordingly. Sometimes the floor space is divided between different departments having different ventilating requirements. The molding floor, the core departments, and the cleaning floor of a foundry, for example, if under one roof, should each have its own sash control.

In ventilating large buildings, one of two general purposes obtains. These are:

(1) To centralize and make easy the control of sash in buildings of unusual size, where the opening of short lengths of sash by hand would take too long and possibly be neglected.

(2) To operate many sash quickly, as in a large foundry in winter, when it is desired to open them for a few minutes to get rid of the smoke without unnecessary loss of heat.

Both of these purposes are satisfactorily accomplished by Pond Operating Device, Motor Driven.

Details

The operating power is similar to the hand operated Pond Operating Device described on page 33, except that it has a bronze gear with steel cut worm. Drive from the motor is by silent chain. The sash will lock securely when left at any degree of opening.

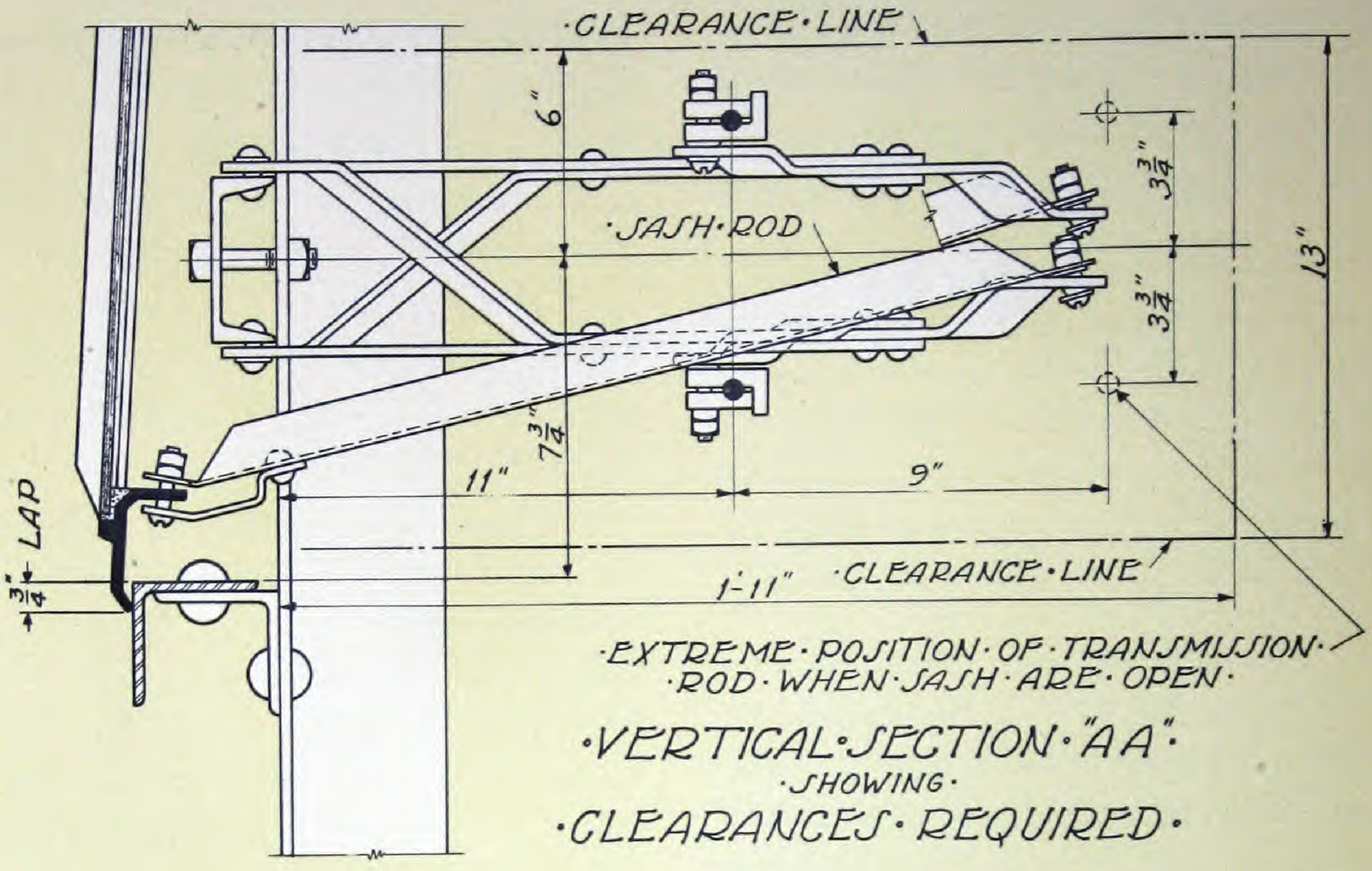
For runs of medium length, where power is located at one end and idler or spiral and counterweight at the other, Type T power is used. For long lines, where power can be located in the center of the run, Type S-2 power is used, with idlers at each end. It is best to consult us before specifying the power wanted.

The motors for Pond Operating Device operate on A. C., 220 or 440 volts, 60 cycle, 3-phase, and are especially wound for high starting torque. They are furnished from stock, which avoids delay. A. C. motors of voltage higher than 440, and D. C. motors, are less satisfactory because of the danger of arcing at the cut-out. Motors with other current characteristics require from four to six months to deliver.

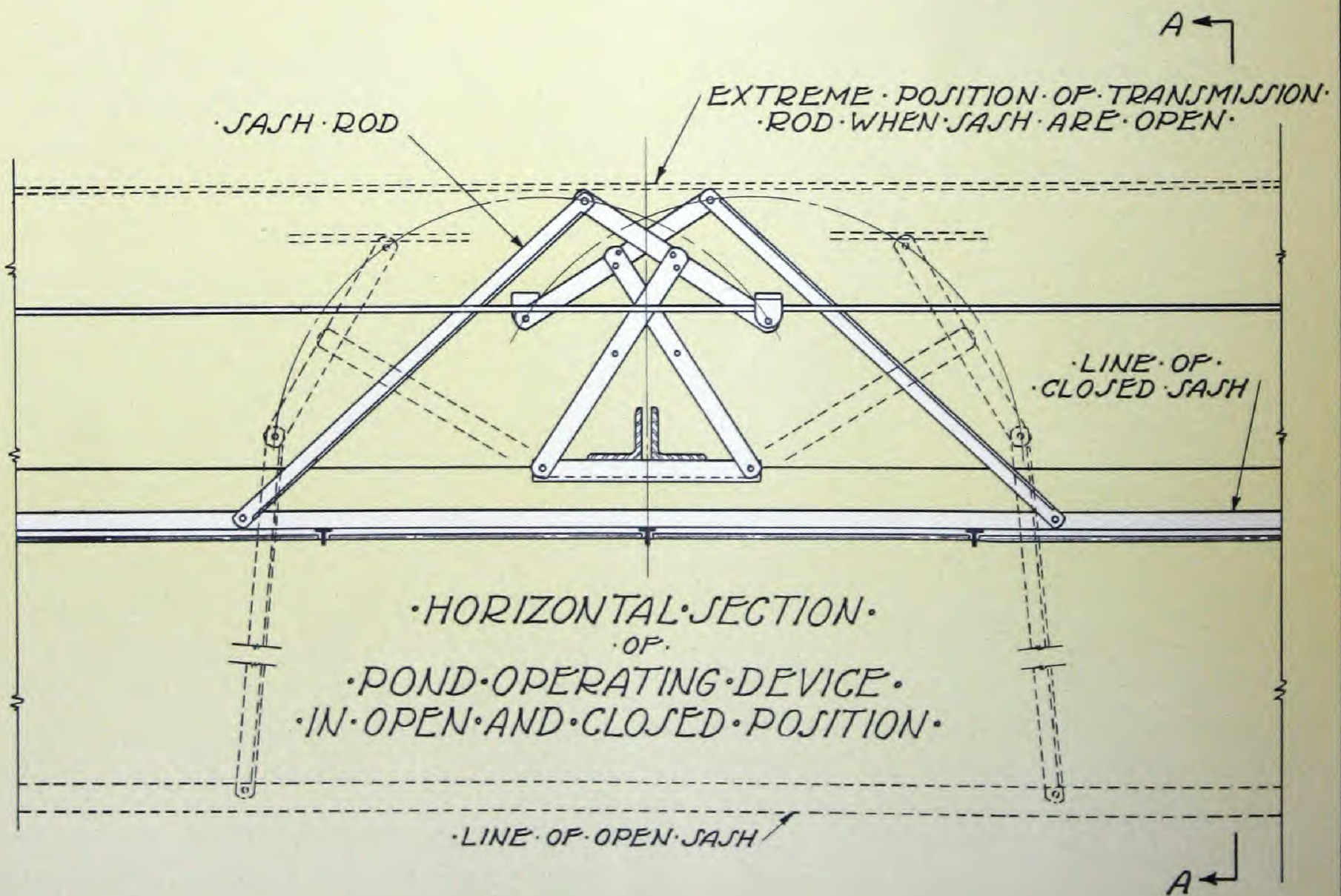
When our regular equipment is used, it is guaranteed against defect of design, material or workmanship for one year. This guarantee is conditional strictly on the wiring being done exactly according to our specifications and does not cover loss or damage from fire or accidents beyond our control.

Consult us freely regarding your requirements, especially with regard to type of power and size of motors.

OPERATOR FOR 3 & 4 FOOT SASH

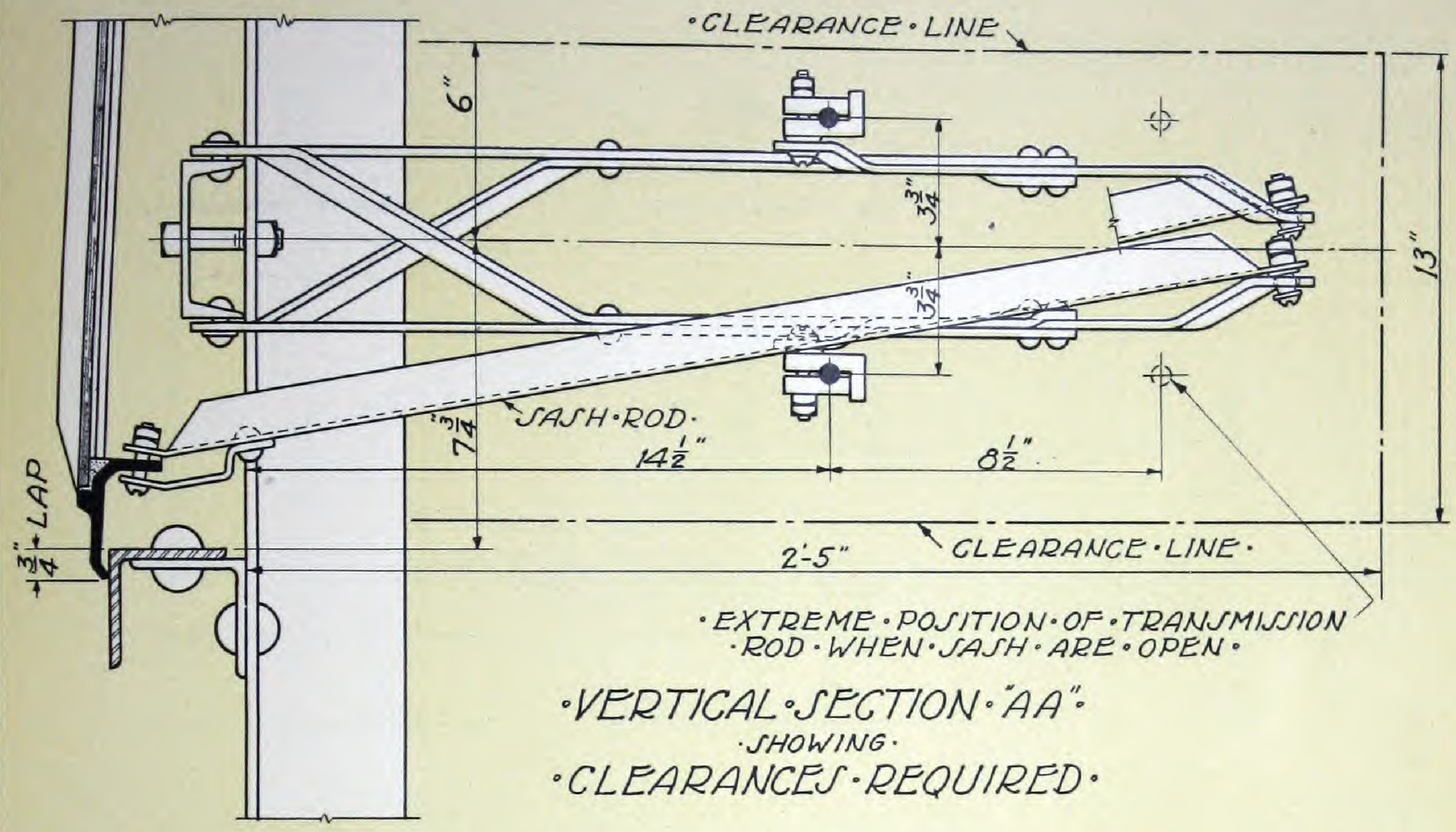


VERTICAL SECTION "A A"
SHOWING
CLEARANCES REQUIRED



HORIZONTAL SECTION
OF
POND OPERATING DEVICE
IN OPEN AND CLOSED POSITION

OPERATOR FOR 5 & 6 FOOT SASH



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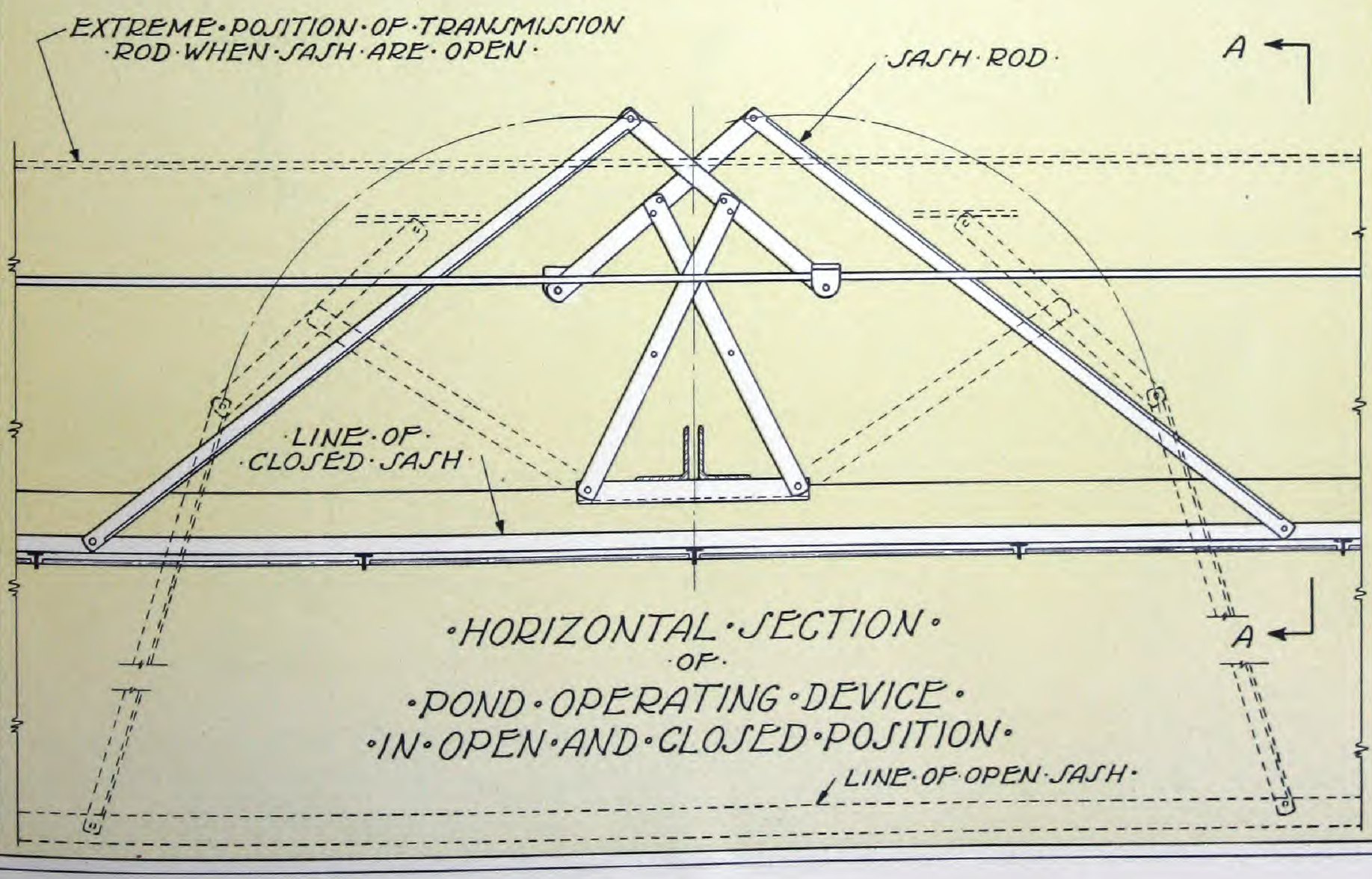
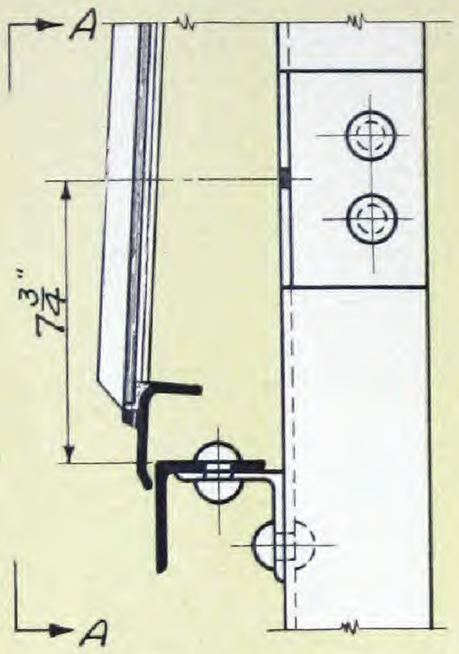
SHOWING
CLEARANCES REQUIRED



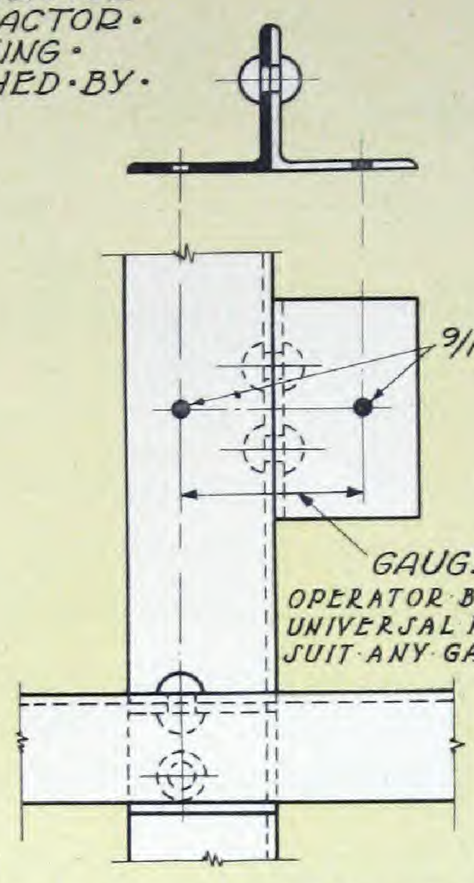
HORIZONTAL SECTION
OF
POND OPERATING DEVICE
IN OPEN AND CLOSED POSITION
LINE OF OPEN SASH

PUNCHING IN SUPPORTS FOR WALL BRACKETS

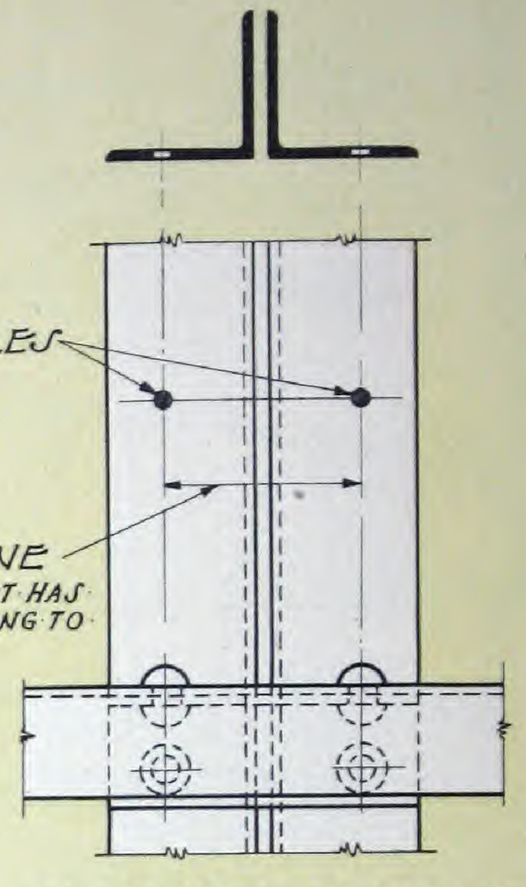
STANDARD PUNCHING REQUIRED FOR ATTACHING POND OPERATING DEVICE TO BE DONE BY STEEL CONTRACTOR STRUCTURAL STEEL OR FLASHING BETWEEN GIRTS **NOT** FURNISHED BY LUPTON



VERTICAL SECTION SHOWING SINGLE ANGLE INTERMEDIATE WITH CLIP

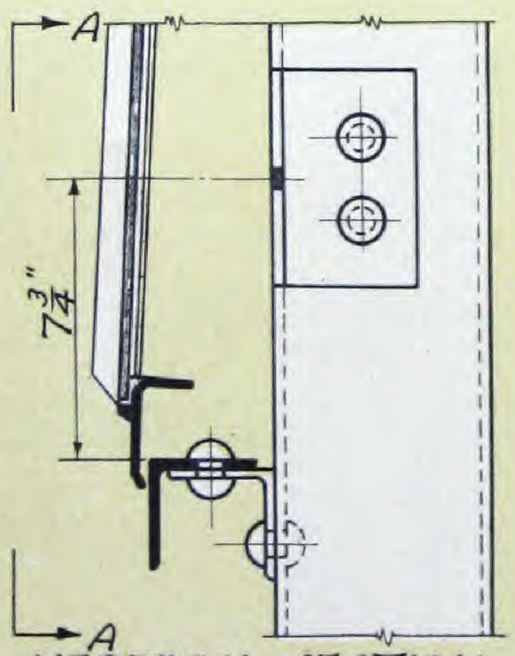


VERTICAL ELEVATION "AA" SHOWING SINGLE ANGLE INTERMEDIATE WITH CLIP

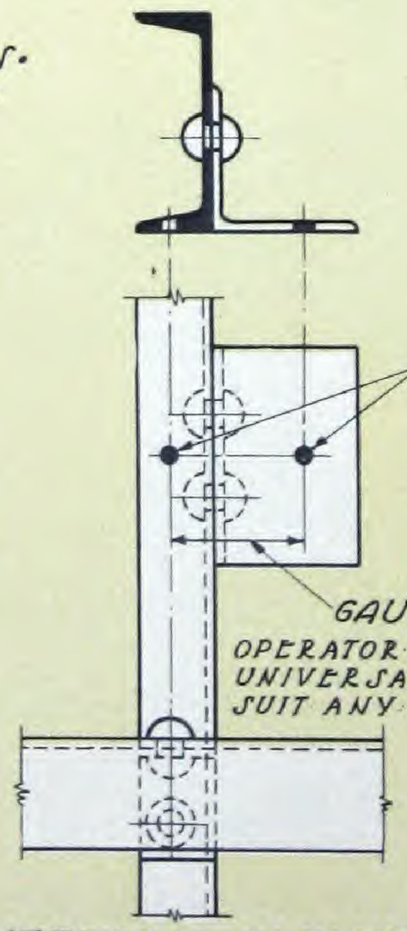


VERTICAL ELEVATION "AA" SHOWING DOUBLE ANGLE INTERMEDIATE

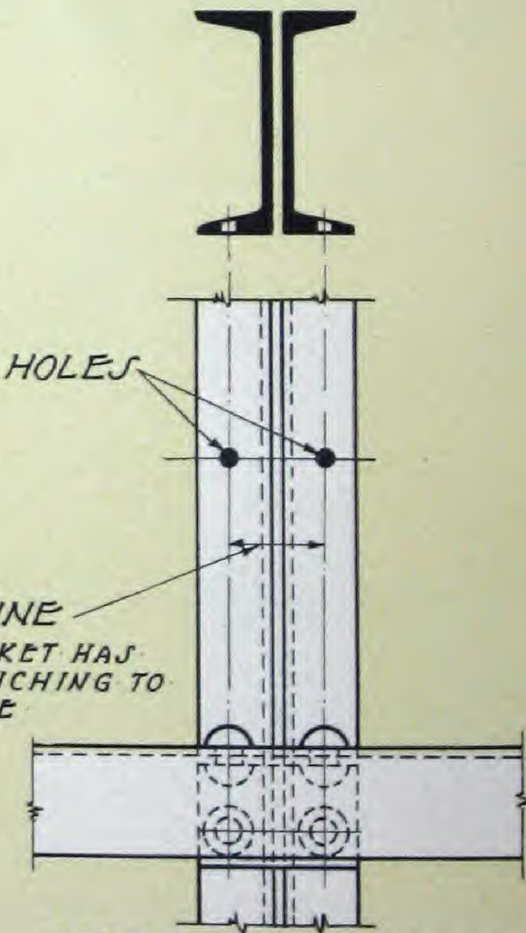
NOTE:- INTERMEDIATE STRUTS TO BE PLACED CENTRALLY BETWEEN BAYS



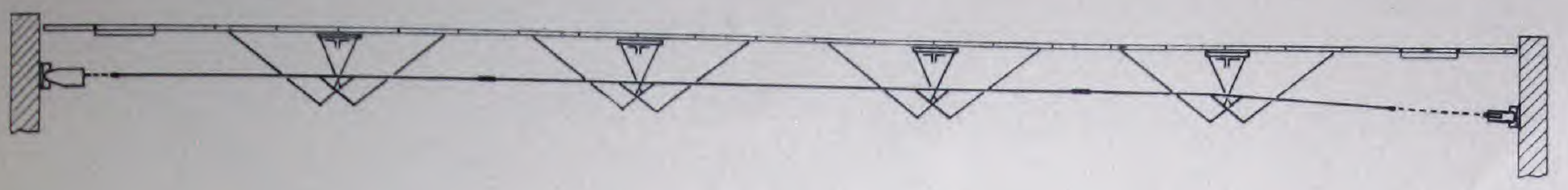
VERTICAL SECTION SHOWING SINGLE CHANNEL INTERMEDIATE WITH CLIP



VERTICAL ELEVATION "AA" SHOWING SINGLE CHANNEL INTERMEDIATE WITH CLIP

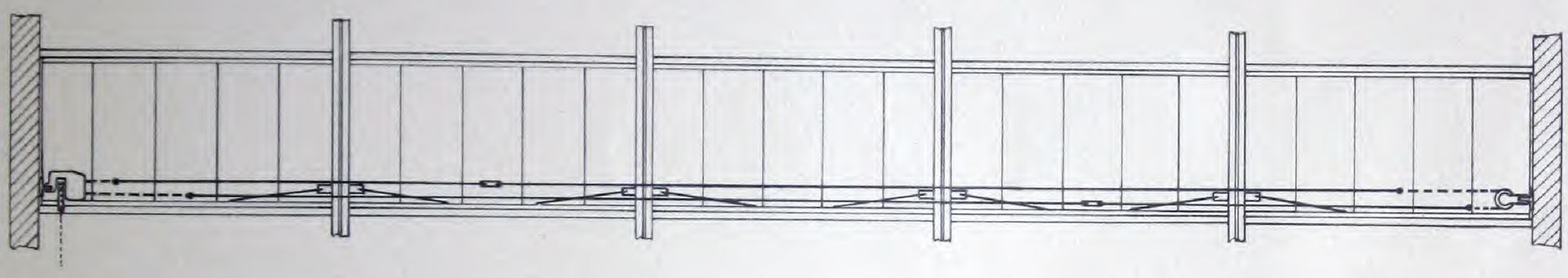


VERTICAL ELEVATION "AA" SHOWING DOUBLE CHANNEL INTERMEDIATE



Plan

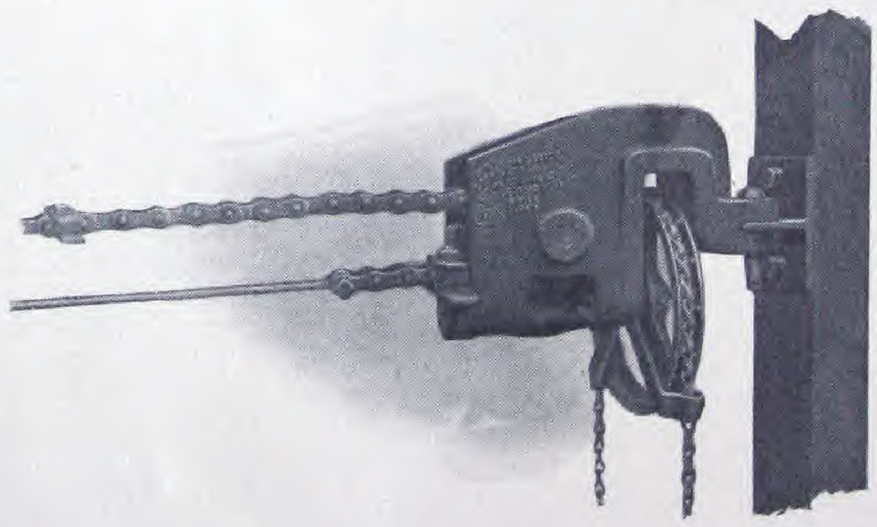
A typical run of Pond Continuous Sash controlled by Pond Operating Device.



Elevation

Sketch shows a typical hand chain controlled Pond Operating Device applied to a line of Pond Continuous Sash. Power is shown at the left, the idler pulley at the right. On extremely long runs, the idler pulley is replaced by a Spiral and Counterweight; see page 35.

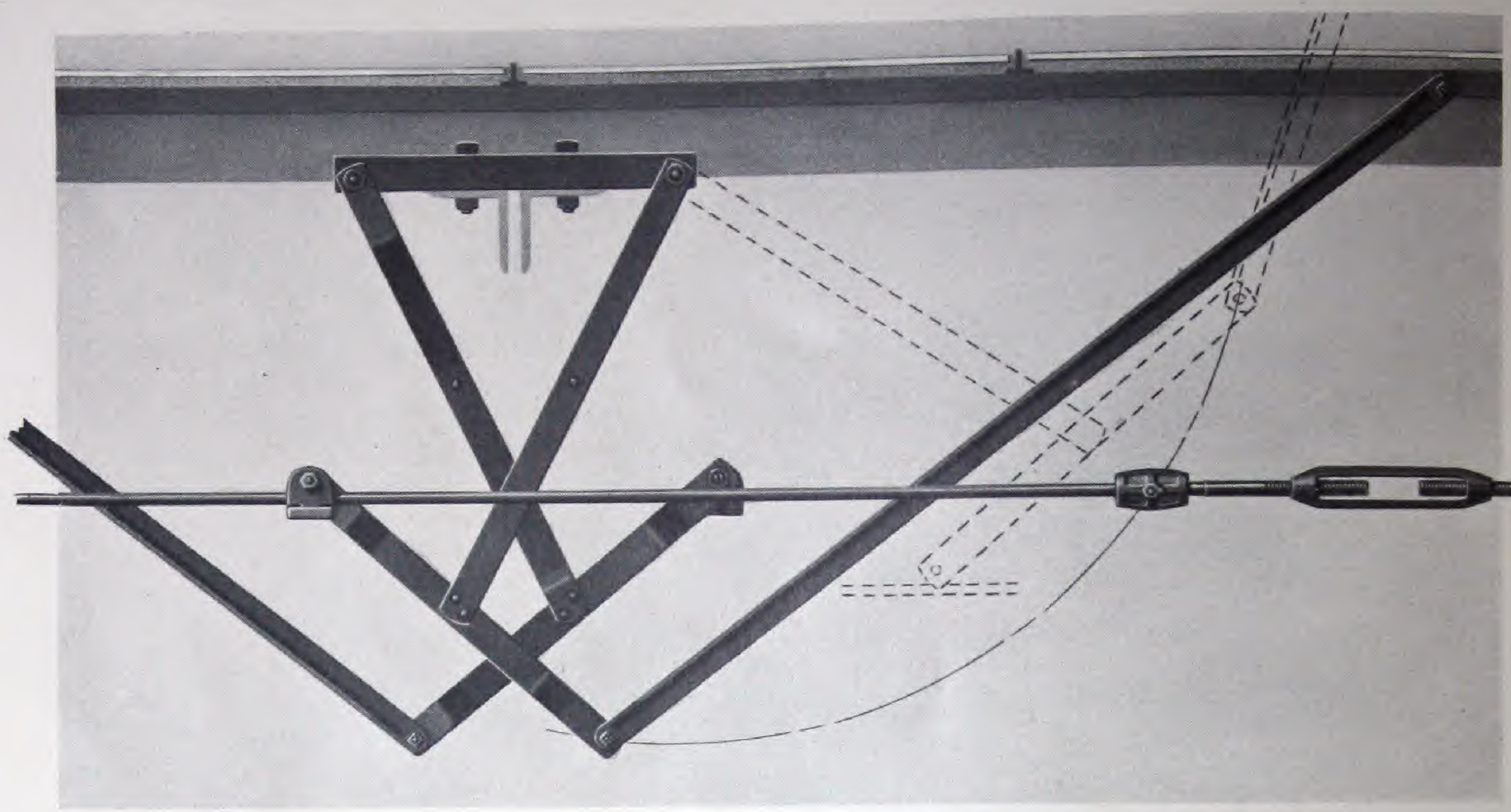
Power and Idler



Pond Operating Device, hand chain control, showing the idler pulley and power. Length of transmission rods is broken for clearness. The ends of the rods are provided with forged eyes to facilitate connection to the chain.

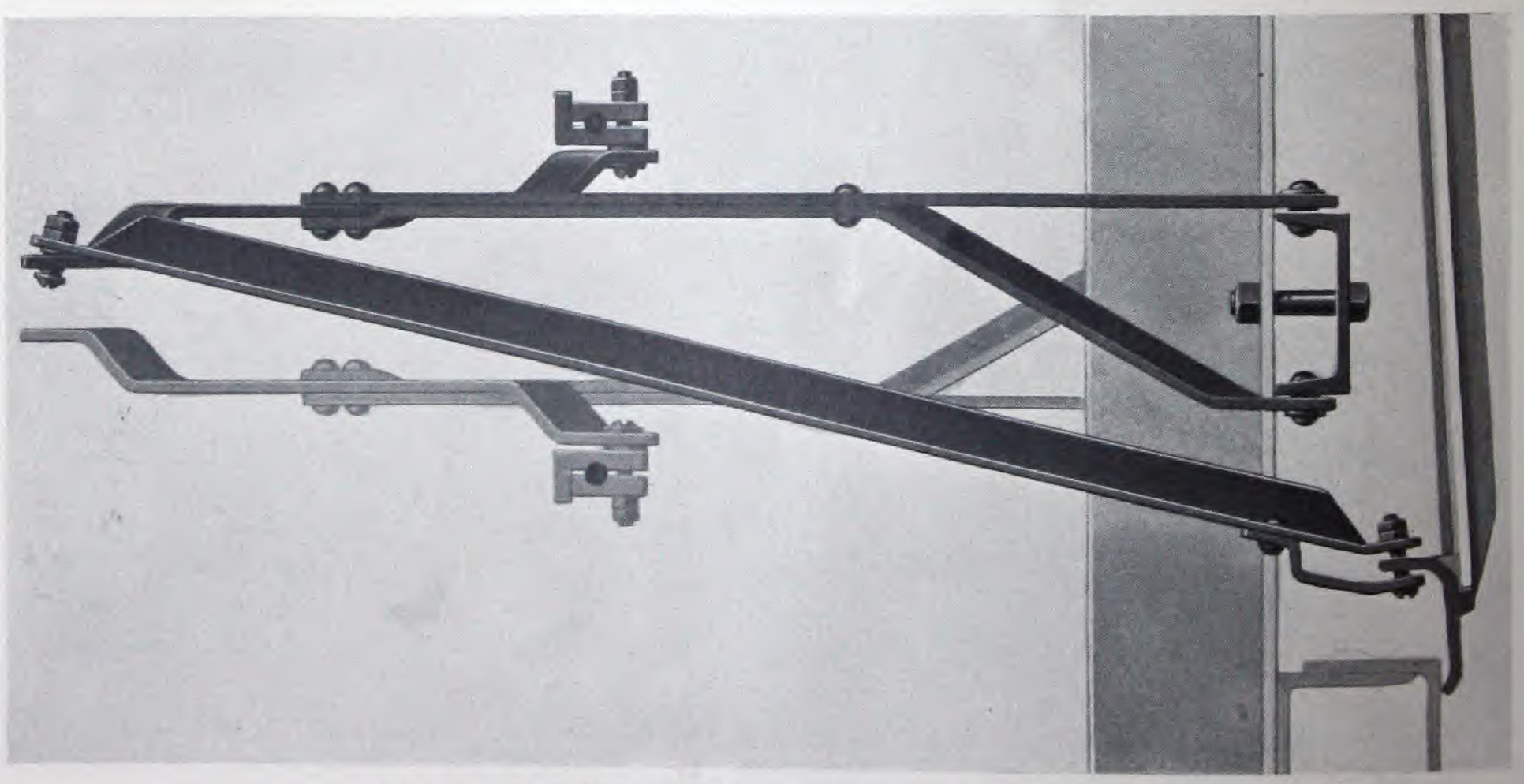
Powers for this type of operating device are carried in two sizes:

Type C, for medium length runs, and Type I, for long runs. View above shows the latter.



Plan of Wall Bracket

View above shows operating arms and sash rod. Dotted lines show open position of arm and transmission rod. A turnbuckle and coupling used in the sash rod are plainly shown in this view.

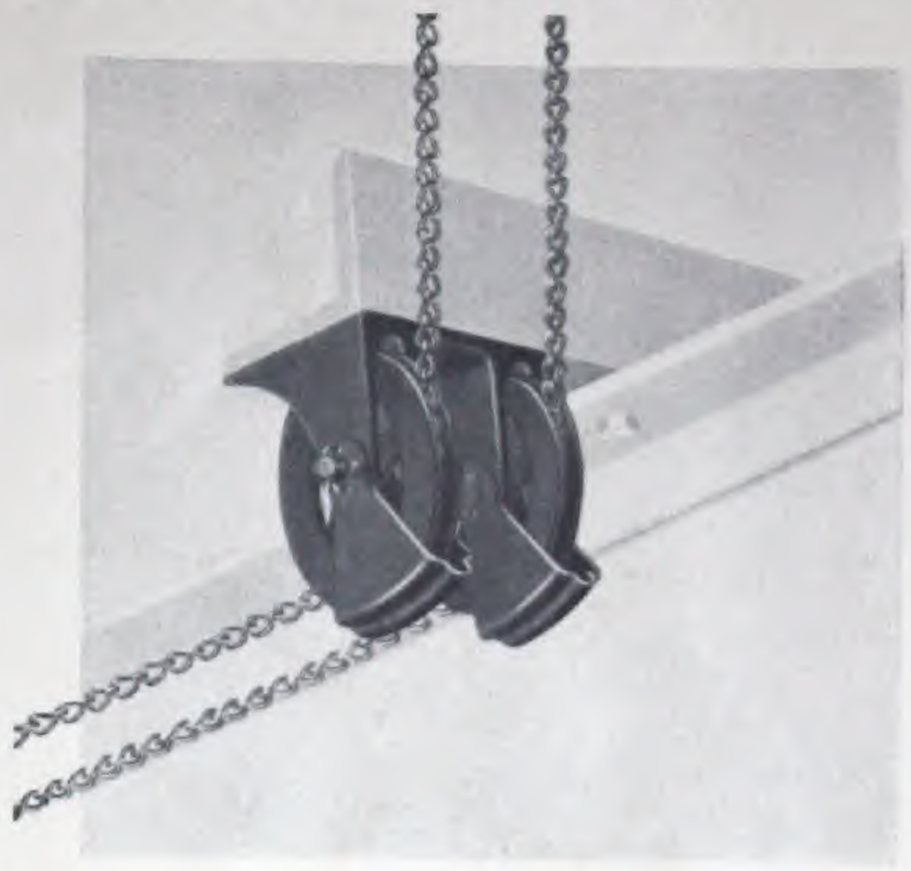


End View of Wall Bracket and Sash Rod Assembly

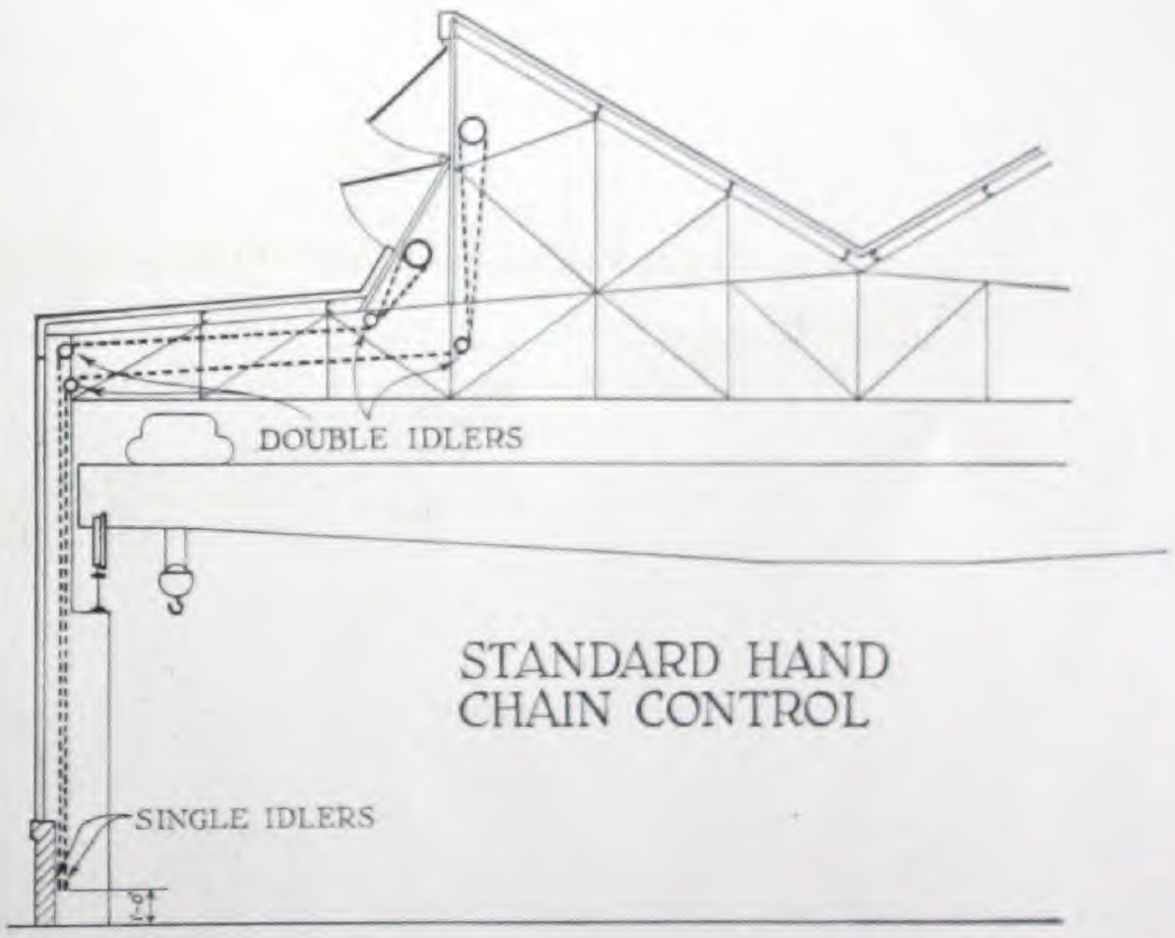
This clearly shows the method used of attaching arms to the bracket and to the sash line. See details on pages 38 and 39.

Hand Chain Control for Roof Sash

Pond Operating Device, hand chain control, is shown here controlling two lines of Pond Continuous Sash in the side of a Pond Roof Design. The hand chain is carried down under the main roof to the side walls by double idlers, provided with chain guards to prevent chain from slipping off the wheels. Halftones on this page show the mechanism used for this device. For



the building shown in cross section below, a double set of single and double idlers would be required—one set for each line of continuous sash to be operated.



STANDARD HAND CHAIN CONTROL

A single idler for each power at the operating station insures against the chain being pulled up out of reach by the weight of the horizontal run of chain.

Other Lupton Products

Lupton Double Hung Windows

Air tight and dust tight plate windows of galvanized steel for office buildings, hotels, apartment houses, schools.

Lupton Counterbalanced Sash

For automatic top and bottom ventilation, the upper and lower sash being hung on a single pair of pulleys. Made of galvanized steel plate.

Lupton Pivoted Sash

For side walls of most any type of building, large or small. Ventilators are horizontally pivoted. Two standard glass sizes. Large choice of sizes in warehouse stocks.

Lupton Operating Device

Designed on the torsion principle. For sidewall steel pivoted sash of average runs. Can be applied to existing sash, either steel or wood. Manual operation.

Lupton Standard Steel Doors

For every commercial and industrial purpose. Made of steel plate, with corners spot welded. Standard sizes in both Hinged and Sliding Types.

Lupton Casements

Heavy Type

Unusually fine casements of steel, combining correct mechanical design, sound workmanship and artistic hardware.

Lupton Projected Sash

Two types, Architectural and Industrial. Ventilators are operated by friction shoes and hold in any position without fasteners. Architectural Type has large lights; Industrial Type glass sizes conforming to Lupton Pivoted Sash.

Lupton Steel Partitions

For industrial and office uses. Easy to erect or to take down and re-locate. Made in interchangeable units.

Lupton Steel Tube Doors

For factories, power houses, and industrial purposes generally where unusual strength is required. Made from seamless steel tube, oxy-acetylene welded throughout.

Lupton Rolled Steel Skylight

Especially adapted to conditions of unusual severity, vibration, wide range of temperatures and inaccessibility for frequent painting. The cap is either of copper or galvanized steel, the bar of steel.

Lupton Residence Casements

For residences, apartments, and buildings of similar types. Made from copper steel, these windows possess the dignity and refinement so much a part of the home of today. Their low price is possible because of quantity production and standardization of sizes and processes.

Lupton Basement Windows

These windows of copper steel will last as long as the house of which they are a part. Two types—Standard and Security; the latter can be locked when open 5 inches, as well as when closed.

Lupton Steel Factory, Store and Office Equipment

Steel Storage, Display and Unit Shelving, Display Counter, Factory Desks, Steel Bench Legs and Drawers, Tool Cabinets, Utility Cabinets, Tote Boxes, Special Steel Racks.

Please mention the products when writing for literature

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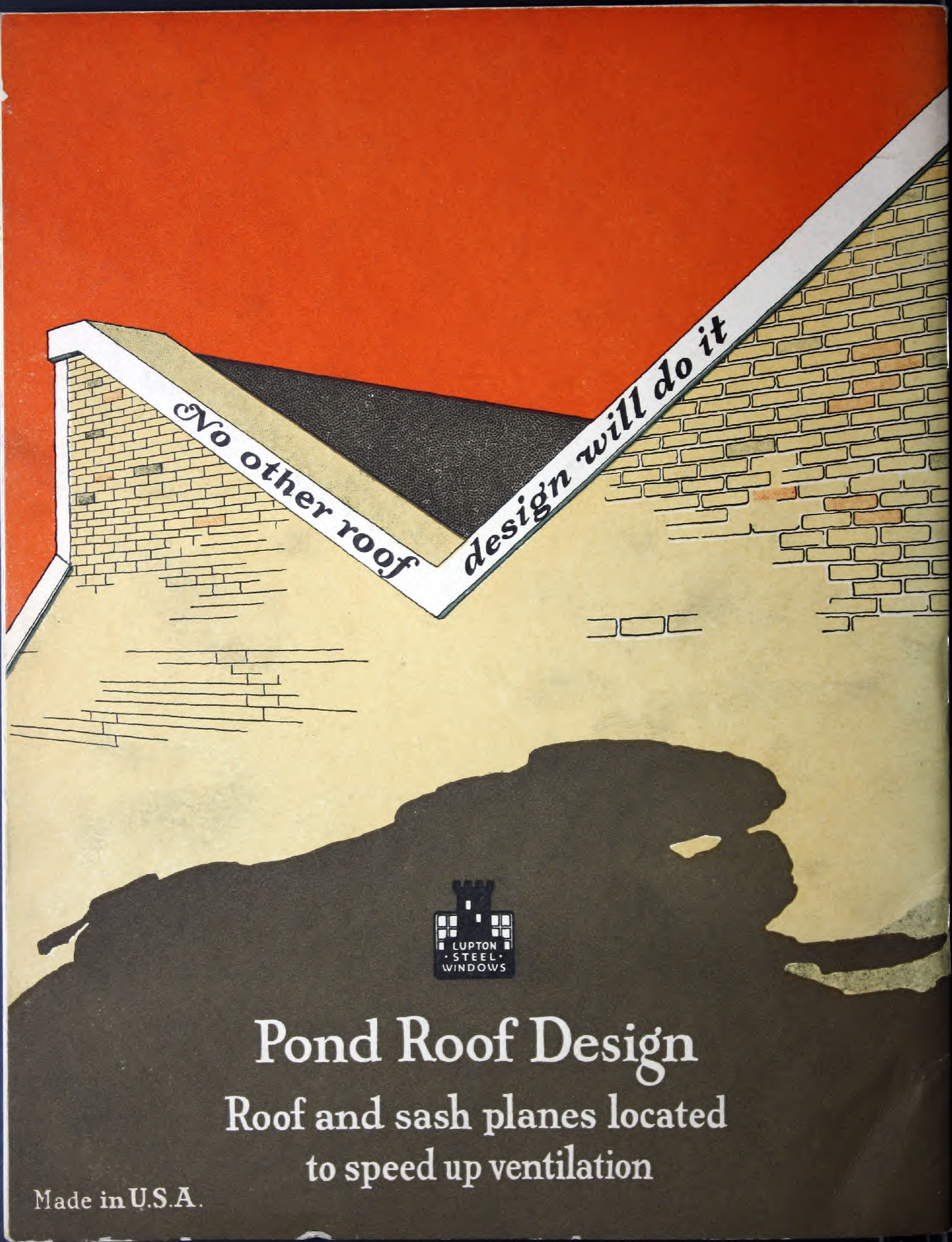

Pond Roof Design

Roof and sash planes located to speed up ventilation

Made in U.S.A.

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